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THE

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DISEASES CAUSED BY BACTERIA AND FUNGI

McCULLOCH, E. C. (1947.) **The resistance of chronic staphylococcic bovine mastitis to massive penicillin therapy.**—*Amer. J. vet. Res.* **8.** 173–177. **613**

Ten quarters of seven cows affected with chronic mastitis caused by *Staphylococcus aureus* were treated experimentally with penicillin. Infusion of a total of 400,000 units in four infusions of 100,000 units at 12-hour intervals resulted in only a temporary reduction in the number of staphylococci in the milk and the plate counts gradually returned to their former levels.

These results do not necessarily apply to acute staphylococcal mastitis.—M. C.

BARBER, M., & ROZWADOWSKA-DOWZENKO, M. (1948.) **Infection by penicillin-resistant staphylococci.**—*Lancet.* **255.** 641–644. [Authors' summary copied *verbatim*.] **614**

Of 100 cases of infection with *Staph. pyogenes* investigated in one hospital between April and June, 1948, 59 yielded penicillin-resistant organisms. Previous studies in the same hospital gave an incidence of 14·1% in 1946 and 38% in 1947.

The 59 resistant strains have been analysed according to type of infection and whether they were isolated in pure or mixed culture.

All 59 produced penicillinase and when tested by streaking a single colony across a penicillin-ditch plate were resistant to at least 10 units of penicillin per ml.

The incidence of resistant strains has been studied in relation to penicillin treatment and epidemiology in an attempt to throw light on their source. It is suggested that a process of selection is the major factor for their increasing incidence in hospitals.

INGALLS, W. L., & JOHNSON, E. P. (1947.) **The recovery of streptococci associated with bovine mastitis from the external surface of the teat.**—*Amer. J. vet. Res.* **8.** 321–324. **615**

Thirty-eight experiments were made to determine if *Streptococcus agalactiae* could be recovered from the outside of the teat prior to milking.

In no case was *Str. agalactiae* recovered from the external surface of a teat which was not shedding the organisms. *Str. agalactiae* was recovered on nine occasions and *Str. dysgalactiae* once in 28 attempts from the outside of the teats of infected quarters. *Str. agalactiae* can remain on the outside of the teat for at least eight hours after milking and may become established deep in the wrinkles of the teat and remain there for several days.—M. C.

EVANS, A. C. (1946.) **The distribution of the various agglutinative types of hemolytic streptococci of Group A.**—*J. infect. Dis.* **78.** 1–17. **616**

In an attempt to find out if there was a correlation between agglutination types of haemolytic streptococci of group A and the nature of the manifestations of the disease of human beings associated with it, a study was made of 444 strains isolated in many countries during a period of many years, which were classified by E. according to Griffith's technique. It was found that the geographical distribution of the predominant types tended to change, this also varying from season to season. Types 3, 8 and 10 were found to be scarlatinal types, with a limited ability to produce other diseases. Type 19 is a predominant scarlatinal type which also produces other streptococcal conditions. Types 5, 13, 14 and 18 do not commonly produce a rash, but occur in suppurative and other diseases. Type 6 also produces suppurative conditions, but may be found quite commonly in scarlet fever.—E. K.-N.

GEZON, H. M. (1948.) **Antibiotic studies on beta hemolytic streptococci: I. Penicillin resistance acquired by Group A organisms.**—*Proc. Soc. exp. Biol., N.Y.* **67.** 208–212. **617**

GEZON, H. M. (1948.) **Antibiotic studies on beta hemolytic streptococci: II. Penicillin resistance acquired by Group B organisms.**—*Ibid.* **67.** 212–215. **618**

GEZON, H. M. (1948.) **Antibiotic studies on beta hemolytic streptococci: III. Penicillin resistance acquired by Group C organisms.**—*Ibid.* **67.** 215–219. **619**

In these three studies comparison is made of the acquired *in vitro* resistance to penicillin of β-haemolytic streptococci of Lancefield's Groups A, B and C. The strains were all isolated from human nose and throat cultures and in none of the cases had there been any penicillin therapy. Resistance to penicillin was induced by 56–60 serial transfers on medium containing penicillin. In Groups A and C the acquired resistance was of a low order, the maximum being 17-fold in A and 15-fold in C. Even this low increase was not obtained in all the strains. In Group B the initial resistance was greater, and the increase was also much greater—up to 120-fold. Control strains from the three groups transferred serially on penicillin-free medium showed no increase in resistance. The original levels of sensitivity were easily regained by Group A, by subculture on penicillin-free blood agar and by intra-cerebral mouse passage. However, in Group B, the resistance was not lost by sub-culture or mouse passage. In Group C the resistance was also maintained, but only two strains were tested.

With the increase of penicillin resistance there was a loss of virulence. The pathogenicity for mice was easily restored by mouse passage in Group A, but was not restored in two out of three strains of Group B, and was restored only partially in Group C.

Penicillin-resistant strains of the three groups showed transient colonial changes, and α and γ types were noted, but on sub-culture on penicillin-free medium, they reverted to the parent form. It is claimed that strains with induced penicillin resistance, which were tested with group antisera prepared from normal strains, showed in some cases loss of the specific group antigen.—M. S. B.

ROTHBARD, S. (1948.) **Protective effect of hyaluronidase and type-specific anti-M serum on experimental group A streptococcus infections in mice.**—*J. exp. Med.* **88.** 325–341. [Author's summary copied *verbatim*.] **620**

Five strains of encapsulated group A streptococci of different serological types, each with a glossy and a matt variant, were studied to compare the rôles of the M substance and the hyaluronic acid capsule in virulence of these micro-organisms. The results indicated that both contribute to the virulence of group A streptococci but that the M antigen is the more fundamental factor.

Encapsulated variants, both glossy and matt, were slightly less susceptible to phagocytosis than those from which the capsule had been removed with hyaluronidase. Glossy variants, containing no M substance, were readily phagocyted; matt, M-containing variants were resistant to phagocytosis except in the presence of anti-M serum when they became fully susceptible.

Only the M-containing, matt strains were mouse-virulent. Mice were protected against infections with these strains: (*a*) By removal of the capsule with hyaluronidase, which resulted in slight protection, but only against 10 M.L.D. Early and intensive treatment was required to produce this effect; i.e., simultaneous injection of enzyme and streptococci followed by prolonged enzyme therapy. (*b*) By a single injection of anti-M serum administered the day before inoculation of the streptococci, which resulted in protection against 100,000 M.L.D. (*c*) By combined use of enzyme and anti-M serum an additive effect of the two protective agents occurred, which resulted in protection against 1,000,000 M.L.D.

LOWENTHAL, J., & GAGNON, A. (1948.) **The inhibition of hyaluronidase by sodium salicylate and its possible metabolites.**—*Canad. J. Res.* Sect. E. **26.** 200–205. **621**

The possible action of hyaluronidase in rheumatic fever and the effect of salicylic acid and its derivatives on that enzyme was the starting point of this work. It was shown that salicylic acid and gentisic acid, a substance formed in the organism from salicylic acid, had no influence on the activity of hyaluronidase *in vitro*. Carboxy-*p*-benzoquinone, the quinone corresponding to gentisic acid, was found to inhibit the enzyme *in vitro*. It is pointed out that conditions *in vitro* and *in vivo* are so different that no definite statement could be made from one for the other and, further, that carboxy-*p*-benzoquinone has not been found in the body, although its formation seems possible.—R. GWATKIN.

PLASTRIDGE, W. N., WILLIAMS, L. F., & PETRIE, D. (1947.) **Vibrionic abortion in cattle.**—*Amer. J. vet. Res.* **8.** 178–183. **622**

Abortions occurred in ten herds free from *Brucella abortus* infection.

V. foetus was isolated from 20 out of 72 foetuses examined. Abortion seemed to occur most commonly after the fourth month. The authors regard serum agglutination titres below 1 : 200 as negative, 1 : 200 as suspicious and 1 : 400 or over as positive. The abortion rate was from 4% to 20%. In positive reactors the agglutination reaction sometimes became negative by the fourth month of gestation. There is some evidence that there is a lowered conception rate following outbreaks of *V. foetus* abortion. In five bulls the serum titres were 1 : 400 up to 1 : 1,600, and they were considered to be infected.—D. L.

RITCHIE, J. N., & STAMP, J. T. (1948.) **Bovine tuberculosis—incorporating a review of John Francis' book.** [Francis, J. Bovine tubercu-

losis. pp. 220. London: Staples Press. 25s.] —*Tubercle, Lond.* **29.** 34–40 & 61–66. **623**

The authors give a review of "Bovine Tuberculosis" by Francis [see *V. B.* **18.** 52] and also their interpretation of existing knowledge concerning the incidence, pathogenesis, diagnosis and control of bovine TB. They consider that many of the opinions expressed by Francis are open to criticism.

Francis estimated that the incidence of TB. in cattle in England is 20%, in Wales 7·5%, and in Scotland 14% with an over-all percentage in Great Britain of 17–18%, while in dairy cows the incidence is 30–35%. R. and S. consider that Francis's estimates are probably reliable. They support Ranke's theory that phthisis develops not because of acquired resistance, but rather on account of an age-acquired native resistance. They note that Francis supported Rich's criticism of that theory and suggest that he should have quoted Paget's (1946) criticism of Rich as well as evidence put forward by Pinner.

They point out that the equivalent of what is called in human TB. the primary complex of Ranke has never been satisfactorily worked out in cattle, and suggest that the portal of entry of the tubercle bacillus in cattle is still not proven. They agree that primary pulmonary complexes do occur in cattle, but they consider that while the figures quoted by Francis indicate that the mediastinal lymph gland is the commonest site of TB. in cattle, this does not necessarily indicate a pulmonary primary complex.

Francis quotes Gofton's figures of 2% as the incidence of TB. in calves, but R. and S. point out that this figure was based on abattoir returns mainly on calves a few days old and cannot be accepted for older calves, few of which are slaughtered.

They question Francis's statement that TB. in cattle cannot be divided into calfhood and adult types comparable to "childhood" and "adult" types in human beings and state that it requires qualification and amplification. They criticize the use of the terms "adult" and "calfhood" as implying differences in the course of the disease depending on age immunity and consider that there are stages in the disease in cattle similar to the classical stages of Ranke and that these are independent of age.

They suggest that the primary focus in cattle progresses much further than is the case in human beings. Lesions up to 5–6 cm. in diameter may occur in cattle as compared with the globular small lesions in man. Such large bovine lesions may become encapsulated and arrested, but localization is only partly successful and chronic broncho-pneumonia often develops. They do not agree that this broncho-pneumonia is similar to the chronic broncho-pneumonia in children and that the pathology and underlying immunological principles are different. In the child this pneumonia progresses rapidly without evidence of immunity, whereas in cattle the pneumonia is chronic and comparable to human phthisis, but in human phthisis there is usually a long period between primary infection and the development of phthisis, whereas chronic tuberculous pneumonia in cattle frequently arises from bronchogenic progression of the primary lung focus.

They discuss the question of exogenous reinfection and agree that there is some evidence that this occurs. They accept the general conclusions Francis drew regarding uterine TB., but contend that an aspiration type of congenital TB. does occur in cattle; on the other hand they consider that there is no evidence to support Nieberle's view that chronic diffuse granulomatous tuberculous mastitis is a form of isolated organ TB.

They review the clinical signs of value in detecting the tuberculous animal and stress the value of the Tuberculosis Order: *i.e.*, that it gives authority for the slaughter of animals dangerous to public health. They discuss the difficulties of vaccination and conclude that vaccination of calves has no place in the TB. eradication programme in Great Britain.

They review the progress made under the Tuberculosis (Attested Herds) Scheme since 1935. 13·4% of the cattle in Great Britain have qualified for the attested register, and the next logical step is area eradication. The present position of bovine TB. in the U.S.A. is quoted in support of the feasibility of area eradication.—D. LUKE.

MANTOVANI, G., & CRESPI, G. (1947.) Sulla presenza di micobatteri tubercolari virulenti in linfonodi macroscomicamente normali di vitelli sani. **[Virulent *Mycobact. tuberculosis* present in macroscopically normal lymph nodes of healthy calves.]**—*Clin. vet., Milano.* **70.** 176–185. **624**

In the examination of a series of 100 calves in which, on naked eye examination, the bronchial lymph nodes appeared to be normal, material from these lymph nodes was inoculated into g. pigs and in those from two of this series virulent tubercle bacilli were shown to be present. In no case were living tubercle bacilli shown to be present in mesenteric-hepatic lymph nodes from these calves.—I. W. JENNINGS.

THORSHAUG, K. (1947.) Et tilfelle av akutt aviaer miliaer-tuberkulose i en storfebesetning. **[Acute avian miliary-tuberculosis in a dairy herd.]**—*Norsk. VetTidsskr.* **59.** 365–373. **625**

Details are given of infection of cattle in a herd with the avian type tubercle bacillus. Of 19 adult animals, two were reactors and of six young ones, three. Milk yield fell to about 25% of normal.

Cattle in southern Norway were infected with avian type bacilli to a greater extent than in other parts of the country.—J. T. GREAVES.

GAUSTAD, V. (1948.) **Tuberculous primary infection in 3 children occurring in connection with fall into highly contaminated river water.**—*Acta. tuberc. scand.* **21.** 281–291. [In English. Summary slightly modified.] **626**

Three children fell into Akerselva (river) in Oslo and were nearly drowned. The river water is highly contaminated with sewage-water. 4–5 weeks after the accident 2 of the children developed erythema nodosum, positive tuberculin reactions and pulmonary changes. In the 3rd child a positive tuberculin reaction and hilar adenitis with pulmonary infiltration were found on examination 10 weeks after the accident. There were no clues to any tuberculous source of infection within the children's families, kindergartens, etc. The possibility of infection with tuberculosis on the occasion of the immersion in water thus remains. The sewage from a sanatorium and from a nursing home for tuberculous patients empties into the river about 300 m. upstream from the site of the accident. Reference is made to earlier investigations by BORGEN and THJØTTA, involving the isolation of *Leptospira icterohemorrhagiae* from the water of Akerselva. After inoculation of river-water into guinea-pigs, several of the animals developed tuberculosis. The author points to the theoretical possibility of human beings, bathing in water contaminated with sewage, becoming infected with tuberculosis.

SWEDBERG, B. (1948.) **The white mouse in experimental tuberculosis.**—*Acta. tuberc. scand.* **22.** 260–272. [In English.] **627**

S. discussed the usefulness of mice in assessing the value of therapeutic agents for TB. Giving the infective dose intravenously he used the length of survival and the naked eye characters of the lesions produced as measures of the severity of infection.

He pointed out the proneness of such mice to illness from other infections.

DUBOS, R. J. (1947.) **The experimental analysis of tuberculous infections.**—*Experientia.* **3.** 45–52. [In English, German summary.] **628**

D. refers to developments in the technique for cultivating the tubercle bacillus. Small inocula (10^{-8} mg. of bacteria) are allowed to develop diffusely in a special medium for a few days only, the most important constituent of the medium being a non-toxic wetting agent, an ester of oleic acid, commercially obtainable under the name of "Tween 80". It produces an emulsifying effect on the tubercle bacilli and in addition it acts as a growth promoting factor. The bacilli, grown in media containing "Tween 80", retain their viability for a long period of time. They can be used in suspensions for agglutination tests as well as for the experimental infection of the developing chick embryo and the mouse, in which they produce an acute and fatal disease of the lungs.—E. KLIENEBERGER-NOBEL.

LARMOLA, E. (1948.) **On the pathogenicity and changeability of strains of Mycobacterium tuberculosis.**—*Acta. tuberc. scand.* **21.** 292–322. [In English.] **629**

The author discussed grades of virulence of tubercle bacilli isolated from infected individuals and also the loss of virulence on artificial cultivation, and modifications which accompany such changes. He dealt also with the capacity of non-pathogenic strains to produce allergy to tuberculin.

PÄTIÄLÄ, J. (1948.) **On different strains of tubercle bacilli in their relation to the clinical picture of the tuberculosis caused by them.**—*Acta. tuberc. scand.* **22.** 227–249. [In English. Author's summary slightly amended.] **630**

Sputa of 22 phthisics were subjected to investigation in order to find out the virulence of the tubercle bacilli. Eleven cases were of the rapidly progressing, malignant type of the disease (type A) while in another eleven cases the character of the disease was clearly of slower progress and benign (type B).

The period of growth of the tubercle bacilli was in cases of type A in only 3 cases 21 days or more with an average of 16 days. Correspondingly it exceeded three weeks in 8 cases of type B, the average being 23·5 days. Rapid growth has accordingly been a symptom of a progressive, malignant disease, while slower growth refers to the more benign types of the disease with a stronger tendency to recover.

3 mg. of a culture six weeks old were diluted with physiological NaCl, and pains were taken to obtain a solution as homogeneous as possible. This emulsion was administered in doses of 0·5 cc.m. to guinea-pigs by way of subcutaneous subinguinal injections. The animals were put to death after two months from the day of inoculation, when they were weighed and examined macroscopically both externally and internally. Extracts of spleen, liver and lungs were subjected to cultures in Löwenstein tubes and histological slides were prepared of them as well. The general condition as well as changes in weight of the

diseased animals did not permit to draw any far reaching conclusions concerning the extent and character of the disease, although it was in the cases of group A that the guinea-pigs as a rule showed greater losses of weight than in the cases of group B correspondingly. This feature was in no way predominant or uniform. The tuberculous changes that were to be found histologically in the cases of group A were generally rather extensive, involving in most cases the entire organ. Abundant necroses were encountered. Epithelioid cells were rather scanty.

In the cases of group B the tuberculosis changes were as a rule not so extensive as in those of group A correspondingly. Necroses were relatively few and occurred for the most part over a limited area. Epithelioid cells were prevalent. Formation of connective tissue was similarly fairly abundant.

On the basis of a classification according to the pathologico-anatomical character of the tuberculosis developed in the guinea-pigs the ratio of the malignant cases to the benign ones in group A proved to be 9 : 1, the corresponding ratio in the cases of group B being 4 : 7.

Thus the author's investigations bear evidence to the existence of an obvious correspondence between the clinical picture of the disease and some biological characteristics of the bacilli referring to a virulence of a definite type.

ANON. (1947.) **Tuberculin and the control of bovine tuberculosis.**—*Lancet.* **252.** 35–36. **631**

The species specificity in tuberculins may be altered by treatment with ninhydrin (triketohydrindene hydrate) or chloramine-T or by exposure of dilute solutions to strong light or by gentle oxidation ; in the human and bovine type strains specificity is enhanced by such treatment while in avian strains and in johnins it is reduced. Application of this treatment to tuberculins used in the field on tuberculous cattle has, however, given erratic results. Sensitivity to tuberculin in tuberculous cattle is reduced after parturition. Increased sensitivity to tuberculin at the site of a first injection is the basis of the Stormont test [*V. B.* **17.** 401] in which a second injection of tuberculin is made seven days after the first in the same place and the result is read 24 hours later. —R. MARSHALL.

AMATO, G. (1941.) L'influenza di sostanze che modificano la permeabilita dei tessuti sulla evoluzione del fenomeno di Koch. **[Influence on the onset of Koch's phenomenon of substances which modify tissue permeability.]**—*G. Batt. Immun.* **26.** 605–622. [English & German summaries.] **632**

Lesions caused by Koch's phenomenon healed in control animals 25 days after re-infection, whereas in animals which were given an injection of testicular extract or calcium gluconate 24 hours before the re-infection they did not heal within this period.—K. J. SINCLAIR.

SCROCCA, P. (1942.) Azione dell'Allium sativum sullo svilluppo in vitro del miobatterio tubercolare. Osservazioni preliminari. **[The effect of *Allium sativum* (garlic) on the *in vitro* development of *Mycobacterium tuberculosis*. Preliminary observations.]**—*Diagn. Tecn. Lab.* **13.** 191–195. Abst. in *Zbl. Bakt. I.* (*Ref.*). **144.** 498. (1944.) **633**

Liquid extract of garlic incorporated, in a concentration of 1 : 10,000 to 1 : 250, in the medium of growth for bovine type tubercle bacilli, inhibits the development of the organism. If asparagine in the medium is replaced by the garlic extract, the bacillus fails to grow altogether. The human type grows well on a medium containing 1 : 10,000 to 1 : 1,000 garlic extract. S. is now trying to determine whether the diallyl sulphide of the garlic extract is responsible for the differing behaviour of the human and bovine types when growing on media containing it.—I. W. JENNINGS.

YUSKOVETS, M. K. (1944.) **[Sanitary measures adopted in summer to control TB. in cattle on farms.]**—*Veterinariya, Moscow.* No. 5–6. pp. 11–13. **634**

A conventional article on the routine disinfection of infected byres, the cultivation of infected pasture and the disposal of infected animals.—K. A. ALLEN.

WESSELS, C. C. (1948.) **The differentiation of acid-fast bacteria by means of serological tests.** —*J. S. Afr. vet. med. Ass.* **19.** 45–57. **635**

An investigation of the antigenic relationships between various acid-fast bacteria from bovine skin-lesions, and between these and acid-fast bacteria from other sources.

Precipitin tests were employed, using purified specific protein antigens and rabbit antisera against these proteins.

The main conclusions arrived at are as follows. The skin-lesion acid-fast bacilli, closely related to one another, are different from the mammalian tubercle bacilli, but as they have group antigens in common an animal may become sensitized by skin-lesion acid-fast bacteria and give a positive tuberculin-reaction. The mammalian tubercle bacilli and the saprophytic acid-fast bacilli are quite unrelated serologically and any possibility of sensitization of a host by saprophytic acid-fast bacteria to mammalian tuberculin can be disregarded. On the other hand a relationship does exist between the acid-fast organisms from bovine skin-lesions, avian tubercle bacilli saprophytic

acid-fast bacteria and the leprosy bacillus, and it is possible that animals sensitized with any of these organisms will react with avian tuberculin.
—A. MAYR-HARTING.

ALIN, K., & HELANDER, S. (1948.) **The distribution of para-amino-salicylic acid in the tissues.**—*Acta. tuberc. scand.* **22.** 283–286. [Authors' summary slightly amended.] **636**

The distribution of para-amino-salicylic acid in the tissues was examined by means of fluorescence microscopy. PAS is accumulated in the elastic fibres. Accordingly, for instance, a normal lung will absorb relatively large quantities of this drug. On the other hand, in tuberculous caverns, where the elastic fibres are severed and partly destroyed, the quantities are smaller. In mice with an exudative form of pulmonary TB., that were treated with PAS, the number of tubercle bacilli in the lesions was less than in untreated control animals which, moreover, had a slightly shorter mean length of life.

POKORNÝ, V. (1946.) Příspěvek k spolehlivosti kožní zkoušky maleinem. **[The effectiveness of the endermic mallein test.]**—*Čas. československ. Vet.* **1.** 44–45. **637**

In 160 horses with influenza, colds and other conditions affecting the upper parts of the respiratory system and conjunctiva, in which the ophthalmic mallein test could not be carried out, the endermic test was used successfully.—E. P.

POKORNÝ, V. (1946.) K aktivini imunisace selat proti července. **[Active immunization of piglets against swine erysipelas.]**—*Čas. československ. Vet.* **1.** 109–115. **638**

In 616 piglets, 6–12 weeks old and 12–30 kg. in body weight, immunity lasting eight months was obtained by inoculation of living culture (0·5 ml. of culture, followed two weeks later by 1 ml.). There were no local or general reactions to the inoculation.

P. suggests that such immunization of piglets with culture is safe and should be introduced generally. He confirms the opinion of Michalka, that pigs younger than three months are difficult to infect with erysipelas. He does not like simultaneous inoculation of piglets and considers that the use of serum is too expensive.—E. PŘIBYL.

HANSEN, A. C. (1947.) Om Forekomsten af Salmonellabakterier hos Husdyr i Danmark. **[Occurrence of *Salmonella* infection in domestic animals in Denmark.]**—*Maanedsskr. Dyrlaeg.* **58.** 369–387. **639**

[The title is misleading, as the scope of the work covered only samples sent in to the laboratory on account of suspected infection to human beings. Thus *S. pullorum*, by far the commonest salmonella species in poultry in many countries, is not mentioned.]

In the course of the routine work at the State Veterinary Serum Laboratory at Copenhagen in the ten years 1936–45, material from 14,600 animals was examined. Of 440 foals, *Salmonella enteritidis* (*jena*) was present in one; of 7,800 calves, *S. typhi-murium* was present in one and *S. dublin* in 383; of 3,220 pigs, *S. typhi-murium* was present in two, *S. cholerae-suis* in seven, *S. enteritidis gaertner* in one and *S. enteritidis* var. *danysz* (*ratin*) in seven; in 290 sheep no salmonella were present; of 2,300 fur animals, including silver foxes, mink, beaver and others, *S. typhi-murium* was present in 14 foxes, seven mink and seven beavers, *S. enteritidis* var *danysz* in one fox, *S. dublin* in 101 and *S. niloese* in one; of 300 rabbits, *S. typhi-murium* was present in three; and of 250 dogs, cats, g. pigs, etc. (data given collectively), *S. typhi-murium* was present in two, *S. enteritidis* in two, *S. gaertner* in one and *S. enteritidis* var. *danysz* in two.

Of 2,051 slaughter animals (769 horses, 818 oxen, 209 calves, 204 pigs and 21 sheep) bacteriologically examined for the Copenhagen abattoirs and meat markets in the same period *Salmonella* organisms were not present in a single carcass.

In the course of routine poultry examination at the Laboratory in the 12 years 1934–45, 27,856 birds were examined. Of 2,005 fowls, *S. typhi-murium* was present in one; of 20,951 chickens, *S. typhi-murium* was present in 22, *S. enteritidis* (*jena*) in one, *S. niloese* in ten and an unidentified type in seven; in 181 ducks no *Salmonella* organisms were present; of 551 ducklings, *S. typhi-murium* was present in 23, and *S. enteritidis* var. *essen* in one; in 100 geese no salmonella were present; of 1,152 goslings, *S. typhi-murium* was present in 29, and *S. enteritidis* (*jena*) in one; in 38 turkeys no salmonella were present; of 247 poults, *S. typhi-murium* was present in two; of 1,164 pigeons, *S. typhi-murium* was present in 231; of 1,167 cage birds, *S. typhi-murium* was present in 24.

H.'s own work comprised the examination of specimens of faeces from various domestic animals and from rats, and also of foodstuffs of animal origin. Of faeces from 517 oxen organisms were present which culturally behaved like salmonella in three, but were not motile; in faeces from 144 calves, 31 horses and 33 pigs, no salmonella were present; of faeces from 239 dogs, *S. typhi-murium* was present in one; in those from cats, no salmonella were present; of those from 129 rats, *S. enteritidis* var. *danysz* was present in three.

The food samples comprised 133 of minced beef, 64 of stuffing, 136 of salads, 300 gulls' eggs

and about 100 samples of foodstuffs suspected of having caused illness in human beings. In none of the food samples were *Salmonella* organisms present.—Alan G. Warren.

Wolff, A. H., Henderson, N. D., & McCallum, G. L. (1948.) **Salmonella from dogs and the possible relationship to salmonellosis in man.**—*Amer. J. publ. Hlth.* **38.** 403–408. **640**

The authors record preliminary results of the bacteriological examination of 100 dogs, 18 of which were found to be excreting 16 different *Salmonella* types, the objects of the study being to ascertain the possible public health significance of canine salmonellosis, and to study the clinical manifestations of the infection.

In some instances dogs were found to be transient carriers of salmonella organisms and it appeared that the dog may be a more frequent host of *Salmonella* than has been realized. The 16 *Salmonella* types isolated during the course of the investigation were serologically, biochemically and morphologically similar to those frequently infecting birds, man and other animals. The dog should be considered a potential source of *Salmonella* infection for man. There were indications that salmonella may be associated with distemper and enteritis.—Clive Briggs.

Chase, F. E. (1947.) **The occurrence and distribution of *Salmonella* types in fowl. II. Studies of artificial *S. bareilly* and *S. oranienburg* infections in hens.**—*Canad. J. Res.* Sect. F. **25.** 316–325. [For part I, see *V. B.* **16.** 340.] **641**

A limited number of hens infected orally with *S. bareilly* occasionally laid contaminated eggs, the contents being infected in some and the shells in others. In one instance it was recovered from an egg, but it was found on P.M. examination of the hen that there was perforation of the duodenum and it is inferred that this accounted for the contamination. A considerable degree of variation in susceptibility was evident, the carrier period ranging from 5 to 40 days. The organisms were recovered from the intestinal tract and in one instance from the spleen. The apparent development of resistance following repeated oral inoculation was demonstrated. In similar experiments with hens orally infected with *S. oranienburg* no contaminated eggs were found. This may have been due to a smaller number of eggs being examined owing to lowered egg production, some of the hens having moulted. Faecal counts were lower than those obtained from the *S. bareilly* hens. *S. bonariensis* was isolated from the faeces of two hens during the experiment.—R. Gwatkin.

Buxton, A., & Gordon, R. F. (1947.) **The epidemiology and control of *Salmonella thompson* infection of fowls.**—*J. Hyg., Camb.* **45.** 265–281. **642**

Salmonella thompson is a common cause of human food poisoning in the United Kingdom, and its incidence in poultry has increased considerably in recent years. In work here described two groups of fowls were used, survivors from an outbreak amongst chickens, and adults that gave a positive agglutination test. Agglutination tests were carried out, and cloacal swabs taken at monthly intervals. Several birds that had survived an infection continued to carry the organisms for some months. The correlation between positive agglutination reactions and positive cloacal swab tests was not very high; a number of carriers never gave a positive agglutination reaction, and the organism could not be demonstrated in some birds with intermittent serological reactions. The organism was frequently demonstrated in faecal samples from the floor of the poultry house at the beginning, but not after some months. The shells of eggs became infected through contact with faeces, but the contents of stored eggs were never infected. Only during incubation of the egg did the organisms penetrate the shell and infect the yolk.

In the second group of birds the organisms were not demonstrated from cloacal swabs, and none of the eggs were infected.

The occurrence of intermittent agglutination reactions was studied. The authors consider that a positive agglutination reaction might be related to non-specific stimuli, such as ingestion of *Bact. coli*, or a high metabolic rate related to egg production. Positive agglutination reactions were demonstrable long after infection had disappeared, but for practical purposes a bird with a titre of over 1 : 20 should be considered a potential carrier. Only clean eggs should be used for hatching; they should be stored in a cool dry place before incubation and be fumigated in the incubator with formaldehyde vapour within the first 24 hours.—A. Mayr-Harting.

Ewing, W. H., & Bruner, D. W. (1947.) **Selection of salmonella and shigella cultures for serologic classification.**—*Amer. J. clin. Path.* **17.** 1–12. **643**

Describes the properties of salmonella and shigella which permit their identification, and the methods of identification, with particular emphasis on the methods to be employed to eliminate paracolon, *Proteus* and *Bact. alkaligenes* before sending a presumptive *Salmonella* or *Shigella* culture to a central laboratory for typing.—A. M.-H.

Hohn, J. (1944.) Zur Frage des Paratyphus C (Orient) und des Suipestifer Kunzendorf. (Allgemeines zu den Erregern der Typhus-

Paratyphus - Enteritis - Gruppe.) [*Salmonella paratyphi C* and *S. cholerae-suis.*]—*Zbl. Bakt. I.* (*Orig.*). **151.** 331–341. **644**

H. claims that *S. paratyphi C* (Orient) and *S. cholerae-suis* var. *kunzendorf* are two different organisms distinct biochemically as well as serologically. He advocates in the first place the use of cultural characteristics for diagnostic purposes. In contrast to HABS & BADER (1943) he regards the Kaufmann-White scheme only as a means of sorting out the various factors of the antigenic structure of bacteria and not as a means of determining bacterial relationships. He therefore challenges their classification of these organisms as *S. paratyphi C* strains. According to H., *S. paratyphi C* (Orient) is an organism transferred from man to man, and endemic in Russia and the western parts of Asia, while *S. cholerae-suis* var. *kunzendorf* occurs primarily in pigs, from which it may be transferred to human beings; it is a European organism.—E. KLIENEBERGER-NOBEL.

HÖKL, J., & SVĚRÁK, A. (1946.) Spolehlivost kultivace při septikemické salmonelose. [**Diagnosis of salmonella septicaemia by culture methods.**]—*Čas. československ. Vet.* **1.** 15–17. **645**

An account of observations on the usefulness of plate cultures for the detection of *Salm. typhimurium*. The authors examined specimens from a large number of muscles, bones, the spleen and some lymph nodes from a cow with acute bronchopneumonia and tympanites. The organism was isolated from the spleen, from 82% of the lymph nodes, from 81·5% of the muscles, and from 92·5% of the bones.—E. PŘIBYL.

I. HUTCHINGS, L. M., & ANDREWS, F. N. (1946.) **Studies on brucellosis in swine. III. Brucella infection in the boar.**—*Amer. J. vet. Res.* **7.** 379–384. [For previous parts, see *V. B.* **15.** 143, and **17.** 124.] **646**

II. ANDREWS, F. N., & HUTCHINGS, L. M. (1946.) **Studies on brucellosis in swine. IV. Semen quality in brucella-infected boars.**—*Ibid.* **7.** 385–387. **647**

III. HUTCHINGS, L. M., DELEZ, A. L., & DONHAM, C. R. (1946.) **Brucellosis in swine. V. Reproduction studies with naturally infected sows and boars.**—*Ibid.* **7.** 388–394. **648**

I. The importance of the boar as an agent in the spread of brucellosis is confirmed by the demonstration of *Br. suis* in the semen of six naturally infected boars.

Nineteen boar pigs, 8–12 weeks old, were infected subcutaneously, intravenously, *via* the prepuce, *per rectum*, *per os* and *per conjunctivam*; agglutination tests and blood cultures were positive in all cases except in one of four dosed *per os*, in all three dosed *via* the prepuce and in two of three infected *per conjunctivam*. *Br. suis* was recovered from the genital tract from one infected subcutaneously, one infected *per rectum* and one infected intravenously.

Three mature boars were infected subcutaneously. *Br. suis* was recovered from testes of one six months later; when the other two were castrated twelve months after infection each had one atrophic and fibrosed testicle; *Br. suis* was not recovered.

The authors emphasize the danger of spread of *Br. suis* by an infected boar both directly and indirectly by contamination of the surroundings.

II. The semen of brucella infected boars was lower in volume (69·4 ml. as compared with 262 ml. in normal boars) with a motility lower initially and of a shorter duration than that of normal boars.

III. Eight pure-bred Hampshire sows and two boars all from an infected herd were maintained for two years to study their breeding history. During this period 14 litters only were produced and 72 piglets reared. *Br. suis* was not recovered from the blood of either sows or boars and the titres fell from "strongly positive" to levels between 1 : 100 and 1 : 25. Of the progeny that were tested all were negative two months after weaning; *Br. suis* was isolated from colostrum on one occasion only.

In each boar there was a unilateral orchitis and in each the affected testicle was removed. They were then put back into service and the breeding results were satisfactory.

The authors conclude that it is uneconomical to maintain a *Br. suis* infected herd unless it is necessary to preserve the blood line from exceptionally valuable sows or boars.—J. A. J. VENN.

GRIMALDI, M., & SANNA, A. (1946.) Sul valore diagnostico della reazione precipitante antibrucellare. [**The diagnostic value of the agglutination test in brucellosis.**]—*G. Batt. Immun.* **34.** 217–222. [English, French & German summaries.] **649**

A conventional article on the value of the agglutination test.—K. J. SINCLAIR.

PAGNINI, U. (1942.) Sulla possibilità di valorizzare con l'inattivazione dei sieri la prova di Wright applicata alla diagnosi dell'infezione brucellare da stipiti in fase "R". [**Serum inactivation as a possible means of assessing the value of the agglutination test in the diagnosis of infection by brucella strains in the R phase.**]—*G. Batt. Immun.* **29.** 649–670. [English, French & German summaries.] **650**

In a study of the thermal resistance of brucella agglutinins in infection with organisms in both

the R and S phase, considerable variation was found in those in the R phase, but less in those in the S phase. In this respect there appeared to be a relationship between the virulence of the strains and this thermal resistance. The value of these observations on the use of the agglutination test for diagnosis of infection is discussed.—K. J. S.

COTTON, C. M., & SWOPE, R. E. (1948.) **Brucella chemotherapy. I. Studies of the effect of para-aminobenzoic acid on brucella** *in vitro*.—*Amer. J. vet. Res.* **9.** 164–168. **651**

COTTON, C. M., & SWOPE, R. E. (1948.) **Brucella chemotherapy. II. Para-aminobenzoic acid in the treatment of experimental brucellosis in guinea pigs.**—*Ibid.* **9.** 169–172. **652**

The inhibitory effect of *p*-aminobenzoic acid and its soluble sodium salt upon the three species of *Brucella* is noted. Each strain was tested in distilled water, tryptose agar, broth and the blood of horse, cow, pig, sheep and man. Depending on the test material, concentrations of 2–20 mg. per ml. of the acid and 5–20 mg. per ml. of the sodium salt inhibited growth of a culture of 300 million organisms in from 18 hours to 40 days. With all samples of blood the sodium salt was more efficient than the acid.

The therapeutic value of the soluble sodium salt of *p*-aminobenzoic acid given subcutaneously was tested against a heavy infection set up in g. pigs by intraperitoneal inoculation with a virulent strain of *Br. abortus*.

In one group the salt was given before inoculation with the brucella culture; in a second group, it was given at the same time, and in a third group, after infection. A 5% solution of the salt was administered in 5 ml. amounts every four hours for 21 days after inoculation, and at the end of 38 days the animals were killed. No *Br. abortus* was isolated when the treatment was begun three days after infection. When treatment was begun two weeks after infection eight out of ten animals were negative on culture, although in two of these eight animals the spleens were enlarged and nodular. *Br. abortus* was recovered P.M. from one or more organs of each animal in the control group.—MARCUS S. BROOKE.

VEILLEUX, J. M. (1948.) **Calfhood vaccination in Quebec.**—*Canad. J. comp. Med.* **12.** 123–129. **653**

An extensive project which has been in operation for approximately ten years, and was originally intended for the control of bovine brucellosis by segregation and slaughter of reacting animals, was modified in 1940 to include calfhood vaccination with *Br. abortus* strain 19 vaccine. Following an initial blood test, herds were classified as non-reacting, slightly contaminated or badly contaminated. Non-reacting herds were retested twice at intervals of not less than two, or more than six months. If negative to all three tests, they were recorded in the Register of Brucellosis-Free Herds, and retested annually. In slightly contaminated herds, reacting animals were identified and isolated on the premises pending a herd retest after a two months' interval. If the infection had not spread to negative animals, the reactors were removed for slaughter or, upon written permission, herded with badly contaminated herds, which were under supervision. If badly contaminated herds were to be admitted to the scheme, the owner was required to sign an agreement to manage his herd in such a way as to reduce the virulence of the infection and to isolate infected animals. Calfhood vaccination was offered free of charge by the Provincial Department of Agriculture. Herd replacements could be by negative cows or ceased reactors from herds of the same sanitary status, or even reacting cows that were no longer aborting. Practically all the field work had been carried out by veterinary practitioners.
—THOMAS MOORE.

VERSHILOVA, P. A. (1947.) **[Immunization against brucellosis with avirulent culture and polysaccharide antigen.]**—*Zh. Mikrobiol., Moscow.* No. 7. pp. 17–21. **654**

Most g. pigs and white mice inoculated with a live, avirulent culture of *Br. suis* 22 in combination with polysaccharide-lipoid complex, and then revaccinated, developed immunity to subcutaneous inoculation of a virulent culture. G. pigs so immunized had a higher resistance (60%) to infection than similarly treated mice (42%). One injection of live, avirulent culture of *Br. suis* 22, immunized most g. pigs against *Br. melitensis*.
—J. T. GREAVES.

PATERSON, J. S., PIRIE, N. W., & STABLEFORTH, A. W. (1947.) **Protective antigens isolated from** *Br. abortus*.—*Brit. J. exp. Path.* **28.** 223–236. **655**

A soluble antigen with good immunizing properties was prepared from *Brucella melitensis* by MILES & PIRIE [*V. B.* **10.** 15, 356 & 746]. Other workers have not been so successful with *Br. abortus*. The present authors used various methods here described for the successful production of *Br. abortus* antigen in the aggregated as well as in the disaggregated state. At the same time they studied the various ways of application *in vivo* of the antigens prepared.

The antigenic substance produced from suspensions of *Br. abortus*, inoculated by various routes in doses as low as 0·0003 mg., caused the production of circulating agglutinins. When larger doses were inoculated intradermally, symp-

toms of toxaemia developed in addition to massive local necrosis at the site of inoculation. The intradermal inoculation of small doses of antigen into sensitized animals produced local oedema and swellings. The antigen, as judged by g. pig tests, possessed considerable immunizing powers.

—E. KLIENEBERGER-NOBEL.

VAN DRIMMELEN, G. C. (1948.) **The viability of Brucella abortus bovis in milk samples from infected cows.**—*J. S. Afr. vet. med. Ass.* **19.** 58–60. **656**

Brucella organisms die out in milk after 3–4 days. It is therefore necessary to test the samples as soon as possible, to collect them under hygienic conditions and to pack them in ice if they have to be sent some distance for examination.

—A. MAYR-HARTING.

KASS, E. H., LICHSTEIN, H. C., & WAISBREN, B. A. (1945.) **Occurrence of hyaluronidase and lecithinase in relation to virulence in** *Clostridium welchii*.—*Proc. Soc. exp. Biol., N.Y.* **58.** 172–175. **657**

Ninety-four strains of *Cl. welchii* isolated from human and animal faeces and from the soil by the use of sodium azide were examined for mouse virulence and for hyaluronidase and lecithinase activity. Tests for lecithinase were carried out as a measure of α toxin concentration.

Besides a general virulence test the authors used a less rigorous test, the ability of a strain to kill mice after intramuscular injection of 0·2 ml. of an 18-hour broth culture along with intra-abdominal injection of 0·8 ml. of the culture and spoke of this as a "toxic" dose.

From a total of 32 strains with both enzyme activities 18 strains proved virulent (56%) while 12 were "toxic". From a total of 34 strains with lecithinase activity only, 16 proved virulent (47%) while eight were "toxic". From a total of 17 strains with only hyaluronidase activity, four proved virulent (24%) while ten were "toxic". In a total of 11 strains having neither enzyme present, three were virulent (28%) while two were "toxic".

83% of the 41 mouse-virulent strains isolated produced lecithinase, while 54% produced hyaluronidase. 70% of all strains isolated were lecithinase producers. 52% of all strains isolated were hyaluronidase producers.—H. WILLIAMS SMITH.

DOLMAN, C. E., & KERR, D. E. (1948.) **Two fatal cases of botulism from home bottled asparagus.**—*Canad. med. Ass. J.* **59.** 412–414. [Summary copied *verbatim*.] **658**

Two deaths from botulism occurred on a farm near Grand Forks, B.C., early in 1948.

Cl. botulinum, type A, was isolated from two bottles of asparagus, put up very unhygienically on the farm some nine months previously. A similar bottle of asparagus had been consumed about 50 hours prior to the fatalities.

The condition was not diagnosed clinically, despite the clue afforded by several chickens dying with paralysis.

The total of recorded outbreaks of botulism in Canada now stands at 5, with 36 persons in all affected, including 21 fatalities.

The causal micro-organisms (types E and A respectively) have been isolated in only two of these outbreaks, both of them occurring in British Columbia within the past four years. In each instance, a homologous culture was isolated from nearby garden soil.

OVERBY, A. J. (1944.) Om Sammensaetningen af den Nogle Anaerobe Gaeringer udviklede Luft. [**Composition of the gases produced in anaerobic fermentations of spoiled canned food, a rapid method of determining the organism responsible.**]—*K. VetHøjsk. Aarsskr., 1944.* pp. 1–32. [English summary.] **659**

O. studied the fermentation reactions of 15 anaerobic sporulating bacteria and utilized the data so obtained for the recognition of the species of anaerobic organism causing decomposition of tinned meat.

A micro-analytical method was used for the determination of fermentation gases—H_2S, CO_2, H_2 and N and combinations of these, and for the differentiation of *Clostridium sporogenes*, *Cl. bifermentans*, *Cl. welchii* and *Cl. butyricum* as indicated by varied proportional production of these gases, estimated quantitatively. Details are given and sources of error and their control are discussed.

The application of this work to the recognition of the organisms responsible for the decomposition of meat is described.—J. E.

BERNKOPF, H. (1946.) [**Experimental work on leptospirosis in man and cattle in Palestine.**]—*Refuah vet., Palestine.* **3.** 49–54. [In Hebrew, abst. from English summary.] **660**

Bovine *Leptospira* infection was experimentally transmitted in calves, the clinical and pathological findings during the first three passages being fatal jaundice in four animals. Bilirubin was positive with direct and indirect van den Bergh reactions reaching values of over 20 mg. %. In three of these jaundiced calves there was a decrease in the R.B.C. count.

In later passages there was a less severe form of the disease, with no jaundice. All cases (icteric and non-icteric) had high blood urea values.

Microscopically, there were dissociation of liver cells, cholangitis and haemosiderosis of the Kupffer cells. Leptospira were demonstrable in sections of liver and kidney and there was inter-

stitial nephritis in all cases. Leptospira were cultured from the blood of two of the calves, and when the strain isolated was compared serologically with a strain of *L. icterohaemorrhagiae* and one of *L. canicola* it proved to be serologically different from both.

B. states that severe human infections were caused by the same organism, antibodies in high titre occurring in the serum of patients with jaundice whose histories showed that they had been in close contact with cattle.—F. E. W.

KOLOCHINE-ERBER, B., & COLLOMBIER, M. (1945.) Isolement d'une souche française de *Leptospira canicola*. [**Isolation of *Leptospira canicola* in France.**]—*C.R. Soc. Biol. Paris*, **139.** 923–925. **661**

In 1945 three human cases of infection with *L. canicola* were investigated. The patients' serum agglutinated *L. canicola* up to 1 : 5,000,000, and *L. icterohaemorrhagiae* up to 1 : 500,000. The patients between them possessed four dogs, an adult pair and two puppies of successive litters. Leptospira were present in the urine of one puppy and one adult dog. Infected urine was inoculated into g. pigs, and after repeated passage through g. pigs *L. canicola* was cultivated.

Details are given of the results of inoculating g. pigs with the strain recovered and of cross immunity tests with g. pigs.—M. R. ORMEROD.

SFORZA, M. (1946.) Segnalazione di mastiti da Asteroides e prove di pastorizzazione del latte inquinato con tali germi. [**Production of mastitis by *Nocardia asteroides* infection, and efficacy of milk pasteurization against this organism.**]—*Boll. Soc. ital. Med. Igiene trop.* **6.** 153–159. [English summary.] **662**

S. encountered ten cases of primary infection of the bovine udder with *Nocardia asteroides* in Eritrea. In the reported cases lesions varied from a slight involvement of the supramammary lymph nodes resembling the lesions of TB., to involvement of the entire mammary tissue. In the udder, the lesions were either discrete or confluent, and there was a greater tendency than in TB. to suppuration and necrosis following secondary invasion by pyrogenic organisms. The organism withstands exposure to 60–65°C. for 30 min. and to 70–75°C. for four min. It is destroyed at 80°C. for 15 min. and at 85°C. for six min.—I. W. JENNINGS.

LASCELLES, J., & STILL, J. L. (1946.) **Utilization of molecular hydrogen by bacteria.**—*Aust. J. exp. Biol. med. Sci.* **24.** 37–48. **663**

Observations are recorded on the utilization of molecular hydrogen by washed suspensions of *Bact. coli* in the presence of (a) methylene blue, an artificial hydrogen acceptor, and (b) molecular oxygen. An extensive study of inhibitors was carried out and, in general, the observations are consistent with the view that hydrogenase is an iron enzyme, active only in the reduced state.

—R. V. S. BAIN.

MORRIS, M. C. (1943.) **The validity of the "percentage law" in bactericidal reactions.**—*J. Immunol.* **47.** 359–371. **664**

M. studied the constitution of "under-neutralised" mixtures of antigen and antibody using the typhoid bacillus and its bactericidal antibody. The bacilli were sensitized with antibody, the mixture was then exposed to complement and the number of bacilli surviving was determined by plate counts. The killing effect of complement depends on its concentration and to some extent any deficiency in antibody is compensated for by an excess of complement. "The percentage of bacteria destroyed in a given time is constant and relative to the excess of antiserum to serum used." These results are in agreement with the "percentage law" concept held for viruses and bacteriophage.—A. A. WILSON.

GAUGHRAN, E. R. L. (1947.) **The thermophilic microörganisms.**—*Bact. Rev.* **11.** 189–225. **665**

G. reviews the literature on the subject.

Thermophilic organisms can be of importance in the spoilage of food, such as milk. The classification of such organisms is unsatisfactory. Their origin is still obscure, and the problem of whether there really is a failure of proliferation or even a failure of survival at low temperatures has yet to be solved. Various theories have been put forward to explain heat resistance, such as :—the presence of protective coating of spores; the formation of spores; a high content of combined water (as found in spores) as a protective mechanism against the coagulation of proteins; the presence of heat stable enzymes; the formation of saturated protoplasmic lipoids in animals and plants living at higher temperatures as compared with the more fluid, less saturated lipoids of animals and plants living at relatively lower temperatures.—A. MAYR-HARTING.

See also absts. **780** (swine erysipelas in sheep after dipping); **784** (*Ps. pyocyanea*); **785–787** (penicillin); **788–792** (streptomycin); **815** and **816** (*B. coli*); **844–848** (technique); **851** (incidence of bovine TB.); **852** (TB., glanders and brucellosis in Poland).

DISEASES CAUSED BY PROTOZOAN PARASITES

VAN HOOF, L. M. J. J. (1947.) **The second Royal Society of Tropical Medicine and Hygiene Chadwick lecture. Observations on trypanosomiasis in the Belgian Congo.**—*Trans. R. Soc. trop. Med. Hyg.* **40.** 728–754. Discussion pp. 755–761. **666**

Reviewing the epidemiological position in sleeping sickness areas of the Belgian Congo, it is shown that a fall in the percentage of new cases from approximately 1·0 to approximately 0·28 was achieved by mass treatment of human cases in 11 years, but that the incidence of cases has since remained constant, and the frequency of strains resistant not only to arsenicals but also to antimony and organic drugs has increased. Evidence is produced that drug-resistant strains existed before mass treatment was introduced, and there is some evidence that such strains are not easily produced by treatment, and being less readily transmissible by tsetse fly than non-resistant strains, do not tend to increase, their apparently greater frequency being due to the suppression of the non-resistant strains.

Preventive treatment with antrypol (suramin), pentamidine (4 : 4^1-diamidinodiphenoxy pentane) and propamidine (4 : 4^1-diamidinodiphenoxy propane) is now being used in some areas, in addition to the treatment of cases. Antrypol injections protect only for three months, and propamidine has certain toxic properties, on which a later publication is promised. One dose of pentamidine isethionate of 5 mg. per kg. will protect a man for six months, and in one area 5,000 people have been protected with this drug since 1945 without a single case developing, though many cases developed in controls.

With regard to the value of treatment in control of sleeping sickness it is pointed out that the disease has been eradicated in the Lake Albert area where 5% of new cases had been occurring annually, and the area has remained free for eight years.

For the treatment of infections with arsenic resistant strains, *p*-arsenosophenylbutyric acid, to which resistance is not easily acquired, gave good results in early cases, but was ineffective in advanced cases. Melarsen oxide which can be given by the mouth in doses of 150 mg. daily, or by intravenous injection (25 mg. on alternate days) gave good results against tryparsamide (sodium salt of N-phenylglycineamide-4-arsonic acid) resistant strains, and favourably influenced the cerebrospinal fluid, but antimonials and diamidines were unreliable in advanced cases. It is believed that *T. gambiense* strains resistant to antrypol and tartar emetic also occur in nature, but the latter are frequent in areas of arsenical resistance, thus confirming the conclusions of Fulton and Yorke [see *V. B.* **14.** 174] that in preparing strains resistant to tartar emetic, atoxyl-resistant trypanosomes should be used.

Experiments are also recorded on the behaviour of *T. gambiense* in animals. *T. gambiense* can maintain itself in pigs for years, being difficult to detect owing to the rarity of flagellates in the blood, and being often only detectable by blood-culture or xenodiagnosis, but transmissibility remains high, though diminishing progressively through a series of pigs. The chain of transmission by flies in goats occurred as easily as in pigs, trypanosomes being rarely observable in the blood for three or four months, the animals eventually recovering spontaneously. The trypanosome also occurs in dogs living alongside man near the habitat of tsetse, and a strain passed through goats, pigs and dogs was shown to be still infective to man.

Strains of *T. brucei* in these animals were also studied. In pigs a benign infection was produced, recovery occurring in about a year. A pig cured of *T. brucei* is refractory to *T. gambiense*, but a pig cured of *T. gambiense* can be infected with *T. brucei*. *T. brucei* was found to cause an infection in goats which was fatal in 3–5 months, and in both goats and dogs the transmissibility index was high. Seven volunteers submitted themselves to bites of tsetse infected with *T. brucei*, none are said to have contracted trypanosomiasis, though one was found positive on one day.

Examining *T. gambiense* collected from wild tsetse, one strain was encountered which failed to infect volunteers until it had been passaged mechanically in g. pigs. It was then transmitted cyclically to another volunteer. This strain was only feebly pathogenic to dogs. It is suggested that this indicates that the infectivity of tsetse-transmitted *T. gambiense* for any given host, can be lost in the course of adaptation to one or many different hosts.

Working on immunity, it is admitted that the injection of trypanosomes into a host under drug protection produces some immunity, although an infection cured by drug-action does not.

Blood culture did not succeed when blood from the patient was employed for its preparation, and the blood from an animal carrying *T. rhodesiense* or *T. brucei* prevented the growth of *T. gambiense*, but not that of *T. congolense* in cultures.

In notes on variation in the ability to undergo cyclical transmission, it is mentioned that this seemed to vary with the ability to grow in culture, and the blood of the long-tailed monkey *Cercocebus* seemed to favour both. The more the disease develops to the chronic stage the less trypanosomes can be transmitted, and trypanosomes in the cerebrospinal fluid can rarely be transmitted. One is forced to suppose that the change of host during the acute stage favours transmission and the virulence to certain hosts, particularly man. No relationship could be found between the transmissibility and the occurrence

of the various long, short or intermediate forms in the blood.

In the discussion DAVEY pointed out that, in laboratory work, to produce a prophylactic effect lasting over several weeks in small animals, it was necessary to give a greater dose of a drug than for curative treatment, and that single doses of drugs given at long intervals may mask infections rather than prevent them, and LOURIE drew attention to the similarity between the failure of tryparsamide in sleeping sickness and sulphonamides in gonorrhoea and drew attention to the recording of *T. gambiense* in an ox.—U. F. R.

—. (1948.) **Discussion: the epidemiology of trypanosomiasis in man and animals.** [Speakers: CARMICHAEL, J., HOARE, C. A., EDWARDS, J. T., BOYD, J. S. K., LOURIE, E. M., HAWKING, F., & LEROUX, P. L.]—*Proc. R. Soc. Med.* **41.** 551–558. **667**

CARMICHAEL divided trypanosomes into those transmitted by tsetse fly, and those not so transmitted. He made the points that *T. equinum* and *T. vivax* outbreaks in S. America are closely correlated with the seasonal distribution of tabanids, as is also surra. *Glossina palpalis*, *G. tachinoides*, *G. morsitans*, *G. swynnertoni* and *G. pallidipes* are concerned with both animal and human trypanosomiasis in Africa. Contact with "fly" is incompatible with domestic stock, but large numbers of human beings live exposed to tsetse. He suggested that a balance may be established between the hosts and parasites, until adverse environmental conditions intervene, and an epidemic occurs. In *G. palpalis* areas cattle can thrive, as it does not transmit *T. congolense*, and *T. vivax* and *T. brucei* do not cause serious disease in good environmental conditions. Treatment of animals in contact with "fly" was of little value as reinfection occurs, and the breakdown of treated herds has been found to indicate the presence of tsetse. Fly areas are not static, but ebb and flow, and game may carry tsetse to new areas. The vast majority of cases of chronic trypanosomiasis of cattle occur outside tsetse areas, and the disease may be contracted in seasonal migrations, but a considerable number occur in cattle far removed from tsetse, and it appears that special conditions are involved which are difficult to reproduce artificially. In domestic animals other than cattle, tsetse transmission is the rule.

HOARE discussed animal reservoirs of the human trypanosomes, *T. rhodesiense* and *T. gambiense*, which he considers closely related and probably identical, and which can only be distinguished from *T. brucei* by the inoculation of human volunteers. It has been shown that *T. rhodesiense* and *T. gambiense* can be maintained in wild and domestic animals for many years without losing their transmissibility to man. They probably originated from *T. brucei*, but there are enzootic *T. brucei* areas where no human cases have been recorded, and *T. rhodesiense* does not revert to *T. brucei* when maintained by cyclical transmission in ruminants.

T. cruzi primarily infects wild animals, but in S. America it spreads readily from man to man by bugs. Although bug infection occurs in the southern states of the U.S.A., no human cases have been recorded. Attention is drawn to occasional human infection with *T. vivax* and *T. lewisi*.

EDWARDS stressed the greater number of trypanosomes involved in animal infections, with marked developmental and antigenic differences, and different responses to chemotherapeutic agents. He pointed out that naganol [suramin] has given good results both curatively and prophylactically for *T. evansi*, even in horses, though adequate repeated doses are necessary, preferably combined with intrathecal administration. Cattle and buffalo can act as reservoir hosts of *T. evansi*, as shown by the serious outbreak of surra in cattle in Mauritius following the importation of Indian animals. He also drew attention to the antigenic affinities of the *brucei* group and *T. equiperdum*.

BOYD thought Carmichael unduly pessimistic as regards the value of drugs in tsetse areas, and pointed out that a dose of pentamidine had been found to protect a man for six months against *T. gambiense*.

LOURIE remarked on the tendency to regard the character of *T. gambiense*, *T. rhodesiense*, *T. brucei*, etc., as fixed, whilst the characters of any particular strain can undergo radical changes, which may be retained for long periods. Infectivity for man may be retained for many years of passage through animals, but it is not unlikely that virulence for man may be reduced.

HAWKING suggested that control of game was necessary for the control of trypanosomiasis, but ample game reserves should be provided for their preservation.

LEROUX drew attention to the influence of temperature on the epidemiology of trypanosomiasis, to the tendency of the human disease to remain confined to the hottest areas in the Rhodesias, and to the report that the incubation of *Glossina pupae* resulted in more flies becoming infected on exposure to an infected meal. The complete disappearance of "fly" from the Northern Transvaal after rinderpest outbreaks has been cited in support of game destruction, but "fly" was actually on the decrease before rinderpest, and all species of antelope were not killed off. Temperature might influence the

development of parasites in the invertebrate host more than is generally realized.—U. F. R.

LEWIS, A. E., & LANGRIDGE, W. P. (1947.) **Developmental forms of *Trypanosoma brucei* in the "saliva" of *Glossina pallidipes* and *Glossina austeni*.—*Ann. trop. Med. Parasit.* 41. 6–18. 668**

From a study of the development forms of *T. brucei* by the examination of salivary exudate obtained by inducing tsetse fly to probe onto slides, it is suggested that completion of the life-cycle in the fly appears to be dependent on the development of the proventricular trypanosomes into peculiar post-proventricular forms, which give rise to the long slender crithidia of earlier workers, and to short crithidia.

The cytoplasm of the proventricular trypanosomes is described as flowing into the posterior portion of the flagellate. The nucleus elongates, enters the swollen posterior portion and divides into two, as does the kinetoplast. The cytoplasm between the pairs of nuclear bodies splits longitudinally to form two crithidia—short and long slender forms. The long forms ultimately degenerate. The short forms develop flagella, and under favourable conditions reach the salivary gland, and attach themselves.

After multiplication, the free flagellated crithidia pass through a transitional stage and develop into metacyclic trypanosomes, the early forms of which are broad, but later thinner forms become common. In the early stages there is a free flagellum varying from 1μ to 8μ in length, but in the later forms it is shorter. The evidence does not favour the inclusion of the round forms in the life cycle. The authors agree with Brumpt that the glands are not invaded by the long slender forms, but by the shorter daughter crithidia.—U. F. RICHARDSON.

LAWS, S. G. (1947.) **Trypanosome counts in *Trypanosoma congolense* infections.—*Ann. trop. Med. Parasit.* 41. 116–117. 669**

A method is described for estimating the concentration of *T. congolense* in the blood of cattle by counting the leucocytes in a Neubauer counting chamber, and from that calculating the number per c.mm. of blood. The ratio of the number of trypanosomes per 500 or 1,000 leucocytes was found by the examination of stained thick blood slides, and from that the number of trypanosomes per c.mm. of blood was calculated. Two charts are given showing curves of the trypanosome count from the first day of infection till it dropped below 2,000 per c.mm.—U. F. R.

TAYLOR, J., & BECKER, E. R. (1948.) **Liver changes in pantothenate-deficient rats infected with *Trypanosoma lewisi*.—*J. infect. Dis.* 82. 42–44. 670**

It was observed that young rats receiving rations deficient in pantothenic acid are capable of developing heavier infections with *T. equiperdum* than normal rats, and of exhibiting red cell anaemia, neutrophilia, basophilia, reduced white cell counts, loss of weight and in extreme cases death. The liver in heavily infected deficient rats appeared small, and the spleen enlarged. Further investigations showed, however, that the ratio of mean liver weight to mean body weight in normal and affected rats was practically identical. The ratio of the mean spleen weight to the mean body weight was definitely greater in affected rats than in normal ones.

Invasion by the trypanosomes of the liver parenchyma and Kupffer cells was observed in deficient rats; agglutinated masses of trypanosomes were not observed in the blood, though they were present in normal infected rats.

—U. F. RICHARDSON.

PACKCHANIAN, A. (1948.) **The fate of *Trypanosoma duttoni* in *Triatoma*.—*Amer. J. trop. Med.* 28. 383–386. 671**

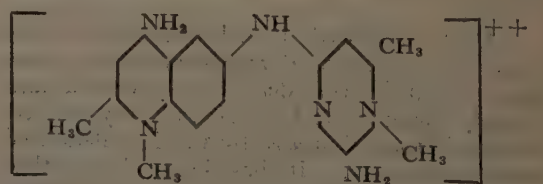
In view of the tendency to assume that any flagellates found in the faecal material, or digestive tract, of *Triatoma* or *Rhodnius* are *T. cruzi*, experiments were undertaken to determine the fate of *T. duttoni* in *Triatoma* fed on infected mice. The organisms were found to survive for two or three days, but failed to multiply, all the flagellates assuming the metacyclic form. *Triatoma* which had been infected three days previously, when crushed and inoculated into mice failed to produce infection.—U. F. RICHARDSON.

MOORE, T. (1948.) **Experiment on the use of DDT in trypanosomiasis.—*Canad. J. comp. Med.* 12. 56–57. 672**

D.D.T. in doses of 150 mg. per kg. and 200 mg. per kg. did not alter the course of disease in white rats experimentally infected with *Trypanosoma equiperdum*.—P. J. G. PLUMMER.

CURD, F. H. S., & DAVEY, D. G. (1949.) **"Antrycide": A new trypanocidal drug.—*Nature, Lond.* 163. 89–90. 673**

This is a preliminary account of a new trypanocidal drug. It had been found that 4-amino-6-(2^1-amino-6^1-methylpyrimidyl-4^1-amino) quinaldine-1 : 1^1-dimetho salts had trypanocidal properties against laboratory infections. These salts having the formula:



are named "Antrycide" salts.

The findings with one of these salts against laboratory infections in mice with various species of trypanosomes are tabulated, therapeutic effect being obtained with infections caused by *Trypanosoma rhodesiense*, *T. brucei*, *T. congolense*, *T. evansi*, *T. equiperdum* and *T. equinum* at varying dosage rates. Toxic effects were not encountered with doses many times those necessary for cure. Strain variations in resistance were observed in some species of trypanosomes.

Prophylactic action was observed in experimental infections in mice, rats and rabbits.

Following the laboratory trials, field trials were instituted in Africa in collaboration with the Colonial Office and the Sudan Government. These trials are not yet completed but it is stated that evidence already available indicates that subcutaneous injection is non-irritant, and that infection in cattle, horses, donkeys, dogs and camels with such species as *T. congolense*, *T. vivax*, *T. brucei* and *T. evansi* can be cured by one dose.

There is also some evidence that the drug protects cattle for some time against subsequent infection with *T. congolense* and *T. vivax*. Further results from the field trials are awaited.—M. C.

WILSON, S. G. (1948.) **Further observations on the curative value of dimidium bromide (phenanthridinium 1553) in *Trypanosoma congolense* infections in bovines in Uganda.**—*J. comp. Path.* **58.** 94–106. **674**

An experiment is recorded in which 57 cattle were inoculated with a strain of *T. congolense* which had been maintained in mice. Fifty-four of the animals were divided into three groups, (1) treated 14 days after infection, (2) on the 24th day, and (3) on the 34th day. The 18 animals in each group were divided into three sub-groups (a) being treated with dimidium bromide (phenanthridinium compound 1553) at 1 mg. per kg., (b) at 1·5 mg. per kg., and (c) at 2 mg. per kg. Half the animals in each sub-group were treated intravenously, and half intramuscularly.

In group (1), excellent results followed treatment, only one animal treated with 1 mg. per kg. intramuscularly relapsing. In group (2), results were also excellent, there being no relapses, and only one case of photosensitization (2 mg. per kg. intravenously). In group (3), two animals relapsed in sub-group (a) and one died in each sub-group (b) and (c), the deaths being ascribed to the toxicity of the drug. Observations were also made on the changes in weight of the animals, and on the haemoglobin values during the course of the experiment.

Results indicate that a period of depression occurs 70–80 days after infection when relapses, deaths and photosensitization are liable to occur. The toxicity of dimidium bromide for cattle requires further investigation in view of the irregularity with which deaths and photosensitization occur; and on account of the toxic action in group (3), in which a stored solution of the drug was used, the effect of storage also requires study. It is also thought possible that the stage of the *T. congolense* infection may be a contributory factor in toxicity.—U. F. RICHARDSON.

TENDEIRO, J. (1945.) Hemo-parasitas da Guiné Portuguesa. (Nota prévia.) **[Blood protozoa of livestock in Portuguese Guinea.]**—*Rev. Med. vet., Lisboa.* **40.** 396–402. **675**

The following protozoa are recorded as occurring in Portuguese Guinea, brief notes being included on the circumstances under which they were encountered:– *Trypanosoma congolense*, *T. vivax*, *T. brucei*, *T. theileri*, *Babesia bigemina*, *B. berbera* [= *B. argentina*], *Anaplasma marginale*, *A. ovis*, *Theileria mutans*, *Th. stordyi* and *Rickettsia ruminantium*.—U. F. RICHARDSON.

WILLEMS, R. (1947.) La trichomonose bovine. **[Bovine trichomoniasis.]**—*Bull. Off. internat. Epiz.* **28.** May. 113–134. **676**

A review of trichomoniasis, which contains a summary of work done in Belgium during the war years. W. mentions that the first case was recognized in Belgium in 1932. In 1937 Florent found the infection in 8% of slaughtered bulls in the Brussels abattoirs, and in July 1938 a serious outbreak was reported from Flanders. In 1944 the disease was diagnosed in 37,751 cattle from 8,799 establishments in nine provinces.

The site of the parasite in the host and the lesions and symptoms are reviewed. In the bull W. concludes that, while there might be a slight initial inflammation of the penis, the lesion tends to disappear soon in most cases or to persist as a little redness and some local granulations. In the female any vaginitis after service should arouse suspicion of trichomoniasis.

Immunity, treatment, and prophylaxis are also reviewed.—GEORGE M. URQUHART.

DEL FIERRO, C. H. F. (1945.) Comprobacion de tricomoniasis genital del bovino en vacas sacrificadas en el Matadero Municipal de Santiago. **[Incidence of bovine trichomoniasis in slaughter cows at the Municipal Abattoir, Santiago.]**—*Agric. téc., Chile.* **5.** 176–196. [English summary.] **677**

In examining 1,000 random samples of mucus from the vagina and uterus of cows slaughtered in Santiago, 21 were found positive for *T. foetus*. In 13 cases pyometra was present, in five cases endometritis and in two cases vaginitis. In only one animal was the genital tract normal.—U. F. R.

ROBINSON, E. M. (1946.) **Trichomonas foetus infection and other causes of infectious abortion in cattle.**—*J. S. Afr. vet. med. Ass.* **17.** 193–201. **678**

A review of some of the more recent publications on trichomoniasis, and of some other organisms capable of causing abortion in cattle.

On trichomoniasis, the symptoms of early abortion, vaginitis, metritis, pyometra and anoestrus are described. Diagnosis depends on the detection of motile trichomonads in fresh discharges, and treatment is based on iodine irrigation. Symptoms, diagnosis, and treatment in the bull are also summarized.

Other organisms capable of causing abortion in cattle are *Salmonella enteritidis* var. *dublin*, *Mycobact. tuberculosis*, and *Vibrio foetus*. Information on *V. foetus* is mostly from American authors, who consider a serum agglutination titre of 1 : 200 or over as positive, though about 75% of positive reactors become negative within three months. The abortion rate among reactors depends on the stage of gestation and previous infection.

—GEORGE M. URQUHART.

JOHANSSON, K. R., MORGAN, B. B., & WINKLER, C. H., Jr. (1947.) **The effects of bacteria on the growth of *Trichomonas foetus* (protozoa).**—*J. Bact.* **53.** 271–282. **679**

The culture medium employed was a modified Schneider's citrate medium and the trichomonad a routine laboratory strain "BR" obtained from a case of bovine pyometra. The inoculum was 50,000 trichomonads per culture tube, all cultures being incubated at 37°C. and growth rates determined by haemocytometer counts of culture samples. The normal growth rate of *T. foetus* was first determined and then the effect on growth of various bacteria, bacterial filtrates, and heat-killed bacterial cultures; pH changes in the cultures were also noted.

In the control cultures, logarithmic growth apparently commenced at the time of inoculation and continued for 72 hours. Peak growth was attained at 100 hours and after 216 hours the numbers decreased rapidly until none could be seen after 240 hours. The initial pH of 7·2 was reduced to a final pH of 5·18.

Bacteria definitely inhibiting growth of *Tr. foetus* included *Corynebact. pyogenes*, *C. diphtheriae*, *Staph. albus*, *Staph. aureus*, *Str. bovis*, *Str. faecalis*, *Str. haemolyticus*, *Bact. coli*, and *Aerobacter aerogenes*. Species slightly inhibiting growth were *Vibrio cholerae*, *Str. pyogenes*, and *C. renale*. No pronounced effect on growth occurred with *Bacillus subtilis*, *Ps. pyocyanea*, and diphtheroid cultures isolated from the genital tract of normal bulls. *Br. abortus* (strain 19) induced rapid multiplication of the trichomonads, but their survival time was shorter than that of the control cultures. *C. equi* prolonged the life of *Tr. foetus* some 288 hours beyond the 240-hour limit of the control cultures.

Bacterial filtrates and heat-killed cultures affected trichomonad growth in a manner comparable to the corresponding living bacteria. The probable nature of these accelerations and inhibitions is considered to be: (1) a change in the pH of the culture medium, (2) toxin production, (3) release of nutrients favourable to trichomonad development.—GEORGE M. URQUHART.

JOHANSSON, K. R., & SARLES, W. B. (1948.) **Bacterial population changes in the ceca of young chickens infected with *Eimeria tenella*.**—*J. Bact.* **56.** 635–647. [Authors' summary copied *verbatim*.] **680**

The cecal flora of 2-week-old chicks on a grain mash or on a synthetic diet changed during the course of infection with *Eimeria tenella*. Numbers of lactobacilli and enterococci were reduced considerably by the fourth or fifth day of infection. Coliform organisms were found to remain unchanged in numbers in the ceca during cecal coccidiosis. The growth of anaerobes resembling *Clostridium perfringens* was stimulated by coccidial infection of the cecum.

A statistical analysis was made of the enumerative data from one of these experiments and revealed that some of the changes which occurred in the cecal flora of chicks maintained on two different rations during the course of coccidial infection were statistically significant. It is believed that *C. perfringens* and *Escherichia coli* complicate the etiology of cecal coccidiosis of the domestic chicken.

FALLIS, A. M. (1948.) **Observations on *Leucocytozoon* infections in birds receiving paludrine, atebrin, and sulphamerazine.**—*Canad. J. Res.* Sect. D. **26.** 73–76. **681**

Paludrine, atebrin and sulphamerazine, in the doses used, had no value in preventing infection with *Leucocytozoon simondi*; and the first two drugs had no effect on established infections. Treatment with the sulphamerazine was commenced at the time of exposure but it had no apparent effect on the level of infection reached in the treated as compared with the control birds. Paludrine failed to cure an established infection of *Leucocytozoon sakharoffi* in a crow. It was considered that the drugs were not effective against the "tissue stages" rather than that the dosages were inadequate.—R. GWATKIN.

GLOVER, J. S. (1948.) **Enterohepatitis in turkeys. Interim report on result of treatment used.**—*Canad. J. comp. Med.* **12.** 36–42. **682**

Experiments were carried out with a quatern-

ary ammonium compound and an arsenical preparation, both of which have been advocated for the treatment of enterohepatitis. Under the conditions of these experiments, there was no evidence that either preparation was of value. Possible reasons for an increase in the disease during the previous year are discussed.—R. G.

SERGENT, Ed., DONATIEN, A., PARROT, L., & LESTOQUARD, F. (1946.) Sur quelques questions de pathologie générale et de pathologie comparée soulevées par l'étude des piroplasmoses bovines. **[Questions of general and comparative pathology arising from a study of the bovine piroplasmoses.]**—*Arch. Inst. Pasteur Algér.* **24.** 1–23. **683**

This is an interesting article on the *Babesia*, *Theileria* and *Anaplasma* of North Africa, part I dealing with their morphology, development cycles, virulence, the influence of immunization on the severity of infections, the specificity of the carrier ticks, and the ability of the various species to survive in ticks. Part II deals with acute manifestations of disease following infection, chronic parasitism, relapses and the extent to which immunity is specific.

It is claimed that in *Th. parva* and *Th. dispar* [= *Th. annulata*] the nucleus of the rod forms is punctiform, whilst in *Th. mutans* it is bacilliform.

In an interesting note on the influence of serial passage on virulence it is stated that 221 passages over 11 years failed to cause any modification in the virulence of strains of *Th. dispar*, and strains of *Anaplasma* showed the same stability. Rapid passages of species of *Babesia* led to exalted virulence, and delayed passage, from animals which had reached the latent stage of infection, resulted in attenuation.—U. F. RICHARDSON.

See also abst. **852** (dourine in Poland).

PEREZ, M. A., & LAGUNA, J. V. (1945.) Observaciones clínicas y diagnósticas en unos casos de theileriosis en Córdoba. **[Theileriasis in Cordoba.]**—*Zootecnia, Córdoba.* **6.** Nos. 13–14. 78–82. [English summary.] **684**

The authors describe an outbreak of what they believe to be *Theileria mutans* infection in a herd of 21 cattle in Spain. One animal, fevered and with signs of digestive disturbance, died after three days' illness and was examined P.M. The digestive tract was normal, connective tissues were icteric, the lungs had a marbled appearance and were inflamed; there were petechial and larger haemorrhages on the epicardium and endocardium, the spleen was enlarged and the lymph-nodes congested. The diagnosis was made on the appearance of the parasite in blood films and spleen smears.

Other animals in the herd, when examined clinically, were found to be infested with ticks and to have bilateral keratitis. They had incoordination of movement and a fluctuating temperature.

Acridine compounds were used for the treatment of the affected animals, and ticks were eliminated by the use of arsenical compounds.

—I. W. JENNINGS.

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

MEYER, K. F. (1948.) **Diagnosis of virus infections.**—*Bull. U.S. Army med. Dep.* **8.** 713–715. **685**

Discussing the diagnosis of virus infections it is pointed out that although the epidemiology may suggest the nature of the infection, neither history nor physical examination make it possible to differentiate between similar virus infections, or between a virus and a similar bacterial infection.

The presence of a virus may be manifested by inclusion bodies, but viruses essentially stimulate or damage cells, the usual response being an inflammatory reaction with the accumulation of lymphocytes, not polynuclear, cells. A leucocyte count below 10,000, with little or no response to sulphonamides or antibiotics, also suggests a virus infection.

To identify the specific agent animal inoculation or tissue culture can be used, but the pitfalls are many. The animal, for instance, may carry another virus, and detection of specific antibodies is therefore resorted to.

To prove the presence of a definite specific agent, serum should be collected in the acute phase, and also in the period of convalescence. The acute phase serum should not contain an appreciable amount of antibody, and in any case less than the convalescent serum. The most significant test is that of neutralization, but neutralizing antibodies may persist for years after latent or manifest infections. Some odd reactions, discovered by accident, such as the sheep cell agglutination test for mononucleosis and the fowl red cell agglutination test for influenza, have proved of value, but there is great need for further development of complement fixation tests. Non-specific substances from the tissues often interfere with the specificity of the reactions, and methods for purifying the antigen are required. Purified antigens may prove valuable for skin tests, and notable progress has been made with the Frei test for lymphogranuloma inguinale.—U. F. R.

ROSSITER, L. W., & ALBERTYN, A. A. L. (1947.) **Foot and mouth disease in game.**—*J. S. Afr. vet. med. Ass.* **18.** 16–19. **686**

Game animals in Kruger National Park are

suspected of being responsible for initial outbreaks of foot and mouth disease in cattle in the Barberton and Pilgrimsrest districts at the end of 1944, and for outbreaks which occurred some months later over a hundred miles away which could not be accounted for by spread by cattle movements.

Seventy game animals of nine species were shot on farms that had apparently just become infected by game; lesions of the tongue were found on one impala, one kudu, two waterbuck, and one sable antelope; of the foot, in one impala and one kudu; and of both foot and tongue in one impala. Material from three of these animals was considered fresh enough for g. pig inoculation. In two cases the results were negative, but material from the tongue of the third animal, a young impala ram, produced lesions in two out of three g. pigs, and pooled material from these two g. pigs produced a lesion in a third g. pig. The impala ram had appeared to be quite healthy, but five small lesions were found on the tongue.

Material from infected cattle injected concurrently into other g. pigs produced lesions identical with those produced by the impala strain, but unfortunately the latter virus was lost when an attempt was made to pass it back to cattle. The need exists for an efficient barrier to separate the game in the Park from cattle in adjacent areas.—E. COTCHIN.

SKINNER, H. H. (1947.) **Foot-and-mouth disease in the hedgehog.**—*Vet. Rec.* **59.** 498. **687**

After a varying number of passages in adult hedgehogs, virus from other species becomes adapted and produces a per-acute fatal disease readily transmissible to healthy hedgehogs by close contact. Experimentally, the hedgehog in the incubation stage of the disease just prior to hibernation has been shown to harbour the virus in its tissues and it may develop and spread the disease on awakening. Foot and mouth disease virus was recovered from the blood and other tissues of a hedgehog caught alive on infected premises in Great Britain in November, 1938, and a bovine animal infected with this strain infected hedgehogs placed in contact, and infected hedgehogs spread the disease to another bovine animal.

During a series of outbreaks in Norfolk in the summer of 1946, hedgehogs with well-developed lesions were found on or near infected premises.—E. COTCHIN.

MENZANI, C. (1947.) Il vaccino antiaftoso al gel di Bentonite (idrosilicato di al). **[Bentonite gel vaccine for foot and mouth disease.]**—*Zooprofilassi.* **2.** No. 11. pp. 11–16. **688**

M. describes in detail the preparation of a variant of Waldmann and Köbe's F. & M. disease vaccine. The basic principles are the same but M. uses as adsorbent aluminium hydrosilicate gel, prepared by the interaction of bentonite with sodium hydrochloride, ammonium hydroxide and either sodium or ammonium citrate. This gel acts also as a buffer, thus simplifying the preparation of the vaccine. Attenuation of the virus is by the combined action of heat and formol and the finished product is said to give results in use comparable with those of the Waldmann-Köbe vaccine.—I. W. JENNINGS.

ANON. (1947.) Résolutions concernant l'uniformisation de la préparation du vaccin antiaphteux. **[Standardization of foot and mouth vaccine.]**—*Zooprofilassi.* **2.** No. 11. pp. 29–30. [In French.] **689**

At a conference at Berne, 1947, under the auspices of the Office Internationale des Epizooties, the following recommendations were made concerning standardization of foot and mouth disease vaccine :– The vaccine used should be the aluminium hydroxide type as prepared by Schmidt-Waldmann. It should be bivalent (types O and A) except where there were indications for a different composition. It should contain at least 0·1 gr. of each virus (in each dose for a large animal) of standardized virulence, properly suspended. It should be formolized and contain sufficient aluminium hydroxide to guarantee freedom from risk during vaccination. It must be submitted to tests for innocuity and bacterial sterility and must immunize when given to cattle in a single 30 ml. dose.—I. W. JENNINGS.

PUNTONI, V. (1947.) Una rivoluzione nel campo della rabbia? **[A revolution in the control of rabies. (Anti-rabies vaccination.)]**—*Zooprofilassi.* **2.** No. 5. pp. 1–5. **690**

Mainly a reply to Webster's criticism of the Pasteurian method of antirabic vaccination. According to P., Webster's work was carried out with Swiss mice, and his results therefore cannot be regarded as being applicable to the larger animals, since it is known that Swiss mice differ from other animals, being the only ones easily infected by mouth. Similarly, the fact that Webster was unable to demonstrate the spread of rabies along the nerves in the Swiss mouse, does not invalidate the findings of other workers that the virus spreads along the nerves in the larger animals.—I. W. JENNINGS.

VACCARI, I. (1947.) Il quadro clinico della rabbia nei grandi e medi erbivori domestici, nei suini e nei volatili. **[Clinical picture of rabies in large and small herbivores, pigs and poultry.]**—*Zooprofilassi.* **2.** No. 5. pp. 5–15. **691**

In the horse, the main clinical features noted are a change in character, and depression followed

by hyperexcitability. There is hyperaesthesia around the point of infection, usually around the mouth or the limb joints, so that the animal bites the affected part continuously. There may be pruritus in any other part of the body. There is mydriasis and often an anxious or fierce expression in the eyes. There is priapism in the male and signs of nymphomania in the female. The animal appears very restless, is constantly on the move, champing, baring the teeth, arching the neck and neighing. The symptoms gradually become more violent and are accompanied by capricious and depraved appetite, but in a short time swallowing becomes difficult and then impossible. Periods of excitement alternate with calm periods, then gradually paraplegia sets in followed by general paralysis, and death due to asphyxia during a muscular convulsion.

In cattle, rabies is manifested by aggressiveness, usually without great excitement, and the early onset of paralysis. There is decrease in milk secretion or complete agalactia and there may be abortion. Here again, there are all the signs of restlessness, alternating with calm almost comatose periods. In other respects the symptoms resemble those in the horse. Death occurs about the seventh day after the onset of symptoms, from bulbar paralysis.

In sheep and goats, symptoms are similar to those in cattle except for the absence, or short duration of, the period of irritability.

In swine almost always there is intense excitement and intolerable itching. Emaciation, weakness and paralysis follow each other rapidly and death occurs in 2–4 days.

In the rare cases of avian rabies, fowls are restless and run or fly about with ruffled plumes, cackle hoarsely and try to peck or scratch other animals and man. After two or three days the birds become paralysed and die. In other cases the symptoms may be somnolence, inappetence, limb paralysis and marked anaemia, accompanied by inco-ordination, manifested when the bird attempts to walk or eat.—I. W. JENNINGS.

JOHNSON, H. N. (1948.) **Derriengue: vampire bat rabies in Mexico.**—*Amer. J. Hyg.* **47.** 189–204. **692**

"Derriengue" is the Spanish name for a disease of cattle occurring on the Pacific coast of Mexico, where it has been prevalent for at least 37 years. It is characterized by an initial period of restlessness followed by paralysis commencing in the hind quarters, salivation and emaciation, the disease being uniformly fatal. It has a cyclical incidence, with an epizootic phase lasting 1–2 months followed by a sporadic phase, and it may then disappear for 1–2 years. Most cases occur between October and April, with the peak of incidence in January and February. It may kill 20 to 50% of the cattle in the area. Other domestic animals (equines) may be affected, but sheep and swine are seldom attacked. Investigations revealed the presence of the virus of rabies in the salivary glands and brain of a paralysed cow, and in the salivary glands and brains of vampire bats caught in the area. There was evidence that the disease was not transmitted by dogs. The virus was inoculable into mice, which became paralysed and developed Negri bodies, but was relatively avirulent for dogs. Eight dogs vaccinated against rabies resisted infection, and out of eight control dogs two developed paralysis but no Negri bodies, though rabies virus neutralizing substance was found in one of the surviving controls. Of two dogs inoculated intracerebrally one developed posterior paralysis but recovered, the other developed no illness.

Notes are given on the detection of bat infested caves by the presence of droppings, and the methods of catching bats by netting the entrance to caves at dusk when they are preparing to fly. All the specimens of bats tested were negative for rabies, except those from a cave near the infected ranch. The virus isolated from the local bats gave cross neutralization, cross complement fixation, and cross protection with a standard bat rabies virus, and also with a fixed Pasteur rabies virus.

It is pointed out that the fact that vampire bats can transmit rabies for an extended period without developing symptoms makes their destruction advisable. Infected bats probably transmit rabies amongst themselves during the breeding season when the males fight for supremacy. This would explain the seasonal incidence of the disease, whilst its extension might be due to infected males being driven out and joining other bat colonies.

It is evident that the rabies virus maintained in bats has been altered in species specificity. It is possible that the apparent absence of human infection in Brazil, Venezuela and Mexico may be due to failure in recognition, but the outbreak of paralytic rabies in man in Trinidad did not develop until the disease had been prevalent in livestock for several years.

Attention is also drawn to the *oulou fato* form of rabies of West Africa, which resembles bat rabies. Dogs are affected but do not appear to be carriers. It is suggested that some species of rodent may be a carrier.—U. F. RICHARDSON.

GROUPÉ, V., & RAKE, G. (1947.) **Studies on the morphology of the elementary bodies of fowl pox.**—*J. Bact.* **53.** 449–454. **693**

The morphology of fowl pox virus as shown by the electron microscope is illustrated by photographs. A sticky coating to the rectangular

particles and unequal forms suggesting division are noted. Similarity to the elementary bodies of other pox viruses is indicated by the findings.
—K. G. Towers.

Chu, C. M. (1948.) **Studies on vaccinia haemagglutinin. I. Some physico-chemical properties.**—*J. Hyg., Camb.* **46.** 42–59. **694**

The haemagglutinin of vaccinia was identified in material from infected chick embryos, rabbit skin and testis, and from sheep skin. C. confirmed that vaccinia haemagglutinin was distinct from the virus particle. It had an estimated size of 65 mμ in diameter and was unrelated to the L-S antigen.

The haemagglutinin was stable within a pH range 5·92–9·79 and was active after boiling for ten min.

Antihaemagglutinin was not present in normal human and rabbit sera, but developed after vaccination. Observations on the level of serum antibody in vaccinated rabbits demonstrated that whereas the agglutinin, precipitin and complement fixing antibodies varied in parallel with each other, antihaemagglutinin varied independently.
—F. D. Asplin.

Blanc, G., & Martin, L. A. (1945.) Filtrabilité des virus de la stomatite pustuleuse des ovins et de la variole aviare. Dimensions des particules virulentes. **[Filtrability of the virus of ovine pustular stomatitis and of fowl pox.]**—*Arch. Inst. Pasteur Maroc.* **3.** 74–80. **695**

Filtration through collodion membranes of known pore diameter gives the measurements of the viruses of ovine pustular dermatitis and fowl pox as between 262 and 100 mμ. The author gives details of the technique for separating the viruses from the cells in which they are contained.
—I. W. Jennings.

Tassi, L. (1947.) Le vecchie norme di polizia veterinaria per la rabbia a contatto con la realta' d'oggi. **[The modern approach to veterinary "policing" for rabies control.]**—*Zooprofilassi.* **2.** No. 6. pp. 1–5. **696**

Following the reappearance of rabies in Florence in May, 1945, after an interval of 15 years, T. advocates the necessity of modifying the existing regulations. Stray dogs should be kept for only three days, not six days, for the owner to reclaim them. During outbreaks of rabies, stray dogs caught in the streets should be returned to the owners with instructions concerning their strict quarantine on the owner's premises for 120 days. The authorities should be notified of the circumstances, so that they may supervise the quarantine. The author does not insist on compulsory preventive vaccination, but he recommends vaccination of suspected in-contact dogs.

Persons bitten by possibly rabid cats or dogs are advised to undergo treatment at latest seven days after being bitten, although the animals are watched for 14 days for the appearance of symptoms. Finally, the author recommends that the 120-day period of quarantine should be increased by law to six months.—I. W. Jennings.

Björkman, S. E., & Horsfall, F. L., Jr. (1948.) **The production of a persistent alteration in influenza virus by lanthanum or ultraviolet irradiation.** — *J. exp. Med.* **88.** 445–461. [Authors' summary copied *verbatim.*] **697**

The rates of elution from RBC of the Lee and PR8 strains of influenza virus were studied by means of a step-wise elution technique. By means of a single treatment with lanthanum acetate or irradiation with ultraviolet and subsequent passage in chick embryos, it was possible to alter the elution rate of the Lee strain so that it was similar to that of the PR8 strain. This alteration proved to be persistent on serial passage in the absence of the agent which caused it. As far as was determined, the elution rate of the virus appeared to be the only property which was altered. The phenomenon can be most readily understood on the assumption that the difference in elution of the two strains is due to a heterogenous population of virus particles in the Lee strain with respect to elution rate.

Kesteven, K. V. L. [Edited by]. (1949.) **Rinderpest vaccines. Their production and use in the field.** pp. 71. Washington: FAO Agric. Studies, No. 8. **698**

I. Daubney, R. (1949.) **Goat-adapted virus.** —*Ibid.* pp. 6–23. **699**

II. Shope, R. E. (1949.) **Inactivated virus vaccine.**—*Ibid.* pp. 23–28. **700**

III. Cheng, S. C., Chow, T. C., & Fischman, H. R. (1949.) **Avianized rinderpest vaccine in China.**—*Ibid.* pp. 29–46. **701**

IV. Cheng, S. C., & Fischman, H. R. (1949.) **Lapinized rinderpest virus.**—*Ibid.* pp. 47–65. **702**

In this booklet the papers presented at the F.A.O. Nairobi Rinderpest Meeting in 1948 are reproduced, the discussions are summarized and the conclusions are set out. The meeting was attended by workers from 22 countries and territories and was under the chairmanship of Sir Daniel Cabot.

I. Daubney, R., dealt with the goat-adapted virus which during the past seven years has been used to immunize at least 15 million cattle in Africa. After a brief historical review of the work of Edwards and others in India, the development of the Kabete goat-adapted strain (KA–5) is described. After the 250th goat passage the strain

was sufficiently attenuated to be used in the field on African Zebu cattle with an overall mortality of less than 2%. Between the 250th and the 400th passage there may have been slight further attenuation but since then it does not appear to have become further attenuated. It is still too virulent for use on cattle with 50% or more of European blood. A substrain developed by passage in Nigerian goats is possibly of milder virulence than the standard Kabete strain. Goats vary in their susceptibility to rinderpest and it is considered possible that further attenuation might be obtained by passage in goats of resistant breeds. The virus is used as vaccine in the form of desiccated spleen tissue which will generally infect cattle in a dose of 0·002 g. As a rule from 5–20 m.i.d. are used as the vaccinating dose. On account of its fragility in the wet state the use of wet virus in the field is not advised. Goats infected with *Brucella melitensis* should not be used as virus producers. The use of antiserum simultaneously with virus to modify the severity of the reaction is not advisable as in many cases it prevents the development of immunity. For the same reason the combined use of inactivated tissue vaccine and goat virus is not practicable. The mortality figures following the use of goat virus in Egypt during 1946 to 1948 are tabulated. D. is of opinion that for all practical purposes cattle reacting to vaccination with goat-adapted virus are not infective to healthy cattle in contact with them. He does, however, consider it possible that spread of infection to goats may have occurred in India as a result of (a) occasional use of goat virus strains in an early stage of adaptation to the goat and (b) the practice of inoculating goats in the field to serve as a source of supply of virulent blood for vaccination of cattle. That rinderpest has not occurred in goats in Africa he attributes to the facts that no goat-virus was released for use in the field until it had undergone at least 250 goat passages, and that there was no inoculation of goats in the field as virus producers except in Nigeria and the French Sudan. The goat-adapted virus may be used with success in infected herds since cattle in the incubation stages of the disease when inoculated are protected almost at once by reason of the interference phenomenon. A table illustrates the difference in time of occurrence of thermal reactions following vaccination in a healthy and in an infected herd. D. considers that the evidence obtained following the vaccination of some 2·5 million cattle in Kenya in 1942–43 and of some 1,100,000 in Egypt in 1947 is sufficient to justify the belief that goat-adapted virus, supported by simple measures to control movement of animals, could be used as a measure for eradication of rinderpest. In the discussion it was stated that no information is available as to the loss of potency which occurs during the drying process. Frequent passage through goats is considered to be unwise lest the virulence be altered. The necessity of testing vaccine before issue by inoculating g. pigs to exclude anthrax was mentioned. It was agreed that the immunity conferred by goat-virus is durable and lasts at least four years. Improvements in apparatus for desiccation and in means of transport are necessary to avoid loss of potency in the field. The vaccine although not ideal, especially since some mortality occurs after vaccination, is the best vaccine available at present and must continue to be used. [In the account of the discussion on this paper and also of the other papers in the booklet it is unfortunate that the names of those who contributed are not given.]

II. There was no formal paper on inactivated tissue vaccines but Shope, R. E., opened a discussion on this subject and summarized the experience obtained at Grosse Isle with vaccines inactivated by the use of chloroform and by formalin. He considers the method impracticable for use in mass inoculation on account of the small number of doses which could be obtained from one vaccine-producing calf. It was not possible at Grosse Isle to produce an inactivated vaccine from egg-passaged material.

In the discussion improvements in tissue vaccines by the use of adjuvants such as alumen gel by French workers in Africa were mentioned, and by this method it was possible to reduce the size of the vaccinating dose with consequent economy in production costs. A serious disadvantage of this type of vaccine was the short duration of immunity.

III. A paper on the avianized vaccine in China by Cheng, S. C., Chow, T. C., & Fischman, H. K., describes the experience with this vaccine since material from Grosse Isle was brought to China by U.N.R.R.A. in 1946. Of eleven batches of seed virus from Grosse Isle only one was viable on arrival and it had died out before equipment for production of vaccine was ready. Attempts were then made to adapt to the chicken embryo two Chinese strains and a Cairo strain, but these attempts were unsuccessful. A bovine strain and also samples of viruses which had had several passages on egg membranes were obtained from Kabete. The Kabete bovine virus was adapted to the chorioallantoic membrane and after 17 passages was adapted to the yolk sac, after nine passages on the yolk sac it was still insufficiently attenuated to be used as vaccine. Attempts to adapt the Kabete egg membrane material to the yolk sac failed but after passage through two calves it was grown on the chorioallantoic mem-

brane of chick embryos. After four such passages it was possible to grow it on the yolk sac and after 16 yolk sac passages it was sufficiently attenuated for vaccine production. The procedure adopted in preparing vaccine from this strain is described. Tests for immunizing properties gave satisfactory results with cattle but not with buffaloes. The vaccine is now undergoing field tests.

About one million doses of vaccine prepared at Grosse Isle were also sent to China. Many of the batches were found to be dead on arrival. The potent batches were used to vaccinate some 400,000 cattle in various districts at a distance from the distributing centre, Nanchang. No deaths attributable to the vaccine occurred and in the areas where vaccination had been carried out no outbreaks of rinderpest occurred during 18 months following vaccination. [It is not stated whether these areas were at risk of infection during this period.]

Much of the discussion in this paper was concerned with the difficulty in adapting rinderpest virus to the chick embryo. In Cairo several attempts to adapt Egyptian strains were unsuccessful and failures have also been experienced with strains obtained from Kabete. Trials of alternate passage in eggs and calves are now being made. In Kabete the original Grosse Isle egg-adapted strains were lost and 11 attempts were made before success was attained in adapting a bovine strain. Two strains were finally adapted first to the chorioallantoic membrane and then to the yolk sac. Both strains were lost, one at the 81st passage and the other between the 35th and 51st passages. Attempts made in India to adapt Indian bovine strains to the chick embryo had failed.

Up to the present time the only strain which it has been possible to adapt has been the Kabete strain. It is possible that the temperature at which the eggs are incubated will prove to be a very important factor and further study with controlled temperatures and humidity are necessary.

The fragility of the egg-adapted vaccine is a great drawback and unless its keeping qualities can be improved it will be of limited value in many areas where rinderpest exists. Field experience of the vaccine is still very limited and the duration of the immunity is not yet known.

IV. Cheng, S. C., & Fischman, H. R., in a paper on lapinized rinderpest virus review the work which has been done since Edwards, J. T., in 1924 first reported on the adaptation of the virus to the rabbit. Nakamura in Japan, Haddow in India, Jacotot and others in French Indo-China and Baker at Grosse Isle have all been able to passage the virus in rabbits. Most workers have reported a thermal reaction in the rabbits, with few or no symptoms and no lesions. Nakamura and Fukusho (1939) however obtained definite lesions in Peyer's patches in the intestines and in the abdominal lymph nodes; these are illustrated by a photograph. Japanese strains of rabbit-adapted virus which had undergone 630 serial passages became available to Chinese workers in 1945 when Peiping was returned to the Chinese and the work done with this strain (Nakamura III) is described. It has been used as a vaccine in many parts of China and has also been sent to Egypt, Siam, India, Kenya, Pakistan and Ethiopia. Rabbits can be infected most readily by intravenous injection, they cannot be infected by contact; all breeds of rabbits seem to be susceptible.

Attenuation of virulence for cattle is slow. In Korean cattle virus of 325 rabbit passages still caused a few deaths. In Mongolian cattle virus of 350 rabbit passages caused only a slight reaction. A virus of 160 rabbit passages caused only a slight reaction in Indian cattle.

The Japanese virus now in Chinese hands causes a mild temperature reaction in cattle and buffaloes. In dairy cattle of European breeds it caused fever in about 50% of the cattle with some temporary decrease in appetite and a reduction in milk yield. Difficulty arises in producing large quantities of rabbit-adapted virus on account of short supply of rabbits in China. An attempt to surmount this difficulty is being made by using as vaccine blood taken from a calf while it is reacting to injection with rabbit-adapted virus. Attempts are also being made to use goats in a similar way. One rabbit is said to be capable of producing 500 doses of vaccine. The duration of immunity in cattle after immunization with this type of vaccine is not yet known. The vaccine is at present under test in Egypt, Gambia, India, Kenya and Nigeria. In India it is reported that the Japanese virus kills rabbits. In Kenya it has been found to cause practically no reaction in cattle and on challenge all cattle so far have proved to be immune.

This booklet will be of interest and value to all workers on rinderpest mainly for the information it gives on the Japanese rabbit-adapted virus which appears to have definite possibilities, particularly should it be proved that the immunity which it confers is of a lasting nature. The difficulties still being encountered in adapting strains of virus to the egg is of great theoretical interest. The place of the goat-adapted virus in large-scale work does not yet appear to be seriously challenged by the newer vaccines. A mistake in printing has occurred, the summary of the paper on the lapinized virus being given at the end of the paper on the avianized virus.—M. C.

SCHEINKER, M. (1948.) **Histopathology of virus encephalomyelitis.**—*Arch. Path.* **45.** 289–298. [Summary and Conclusions copied *verbatim.*] **703**

A study of cases of Japanese, or type B, epidemic encephalitis, poliomyelitis and Vienna, or type A, epidemic encephalitis (von Economo's lethargic encephalitis) discloses the following characteristic histopathologic changes, common to various types of virus encephalitis :– 1. The morbid process is characterized by primary involvement of nerve cells of the gray matter of the brain and of the spinal cord, with relative sparing of the white substance. 2. The destructive alterations of the nerve cells are predominantly focal in character and are accompanied by focal proliferation of microglia cells, with formation of characteristic glial nodules. 3. The distribution and the severity of the inflammatory changes do not correspond with the distribution and the degree of the neuronal damage. There is no direct parallelism between the degenerative and the inflammatory lesions. 4. The differentiation among various types of virus encephalitis, from the histopathologic point of view, must be based on the distribution of the lesions. In cases of Japanese B encephalitis the structures most severely affected are the cerebral cortex, the thalamus and the substantia nigra. The lesions of the cerebellum, the medulla and the spinal cord are discrete and inconstant.

In human poliomyelitis the brunt of the morbid process is borne by the nerve cells of the gray matter of the spinal cord and of some of the cranial nerve nuclei of the medulla and the midbrain. The lesions of the pons, the cerebellum and the basal ganglions are discrete and not constant. The cerebral cortex is often spared. The pathologic process produced in lethargic encephalitis is most intense throughout the basal ganglions and the substantia nigra. Whereas discrete focal lesions may be observed within the midbrain and the pons, they are, as a rule, absent from the cerebral cortex, the cerebellum and the spinal cord.

ANON. (1947.) La peste bovina. **[Rinderpest.]** —*Zooprofilassi.* **2.** No. 3. p. 9. **704**

Owing to the appearance of rinderpest in Malta, Italian veterinary surgeons are warned to look out for the disease, which is recognized by initial fever, diarrhoea, general emaciation, congestion of the mucous membranes of the head, haemorrhagic enteritis and prolapsed rectum. The disease is notifiable and involves destruction of sick and in-contact animals and a 40-day quarantine after the death of the last sick or suspect animal.—I. W. JENNINGS.

SBRAGIA, G. (1947.) Peste suina in Val d'Arbia. **[Swine fever in Val d'Arbia.]**—*Zooprofilassi.* **2.** No. 7. p. 14. **705**

Swine fever in Val d'Arbia is a grave problem in animals from 3–12 months old. Pigs in large herds are not affected so often as those kept singly. Crystal violet vaccine has given satisfactory results. S. considers that the state of nutrition influences the severity of the disease.—I. W. J.

SJOLTE, I. P. (1947.) Om cytoplasmatiske og nucleare Inclusioners Forekomst ved spontant forekommende Hundesyge. **[Occurrence of cytoplasmic and nuclear inclusion bodies in dogs with distemper.]**—*Skand. VetTidskr.* **37.** 350–364. [Abst. from English summary.] **706**

Twenty-eight dogs with distemper were studied for the presence of inclusion bodies. Sections from the trachea, bronchi, lung, bile duct, liver, pelvis of the kidney, bladder, spleen and mesenteric lymph nodes of each dog were examined. Sections of the hippocampus of some of the dogs were also examined.

For fixation mercury sublimate proved to be best; for staining, the Lentz method. The duration of illness before death or destruction did not appear to influence the incidence of inclusion bodies; they were difficult to demonstrate in decomposed carcasses. Inclusion bodies were present in 52% of tracheal mucosa, in 48% of bladder mucosa and in 44% of bile duct specimens. If specimens from all three of these tissues were examined inclusion bodies were found in 82% of cases. These bodies were also found in the bronchial mucosa, the lung, kidney and mesenteric lymph nodes; they were not found in the hippocampus. The inclusion bodies were present both in the cytoplasm and the nucleus of the cells.

GORHAM, J. R. (1948.) **Pollak's trichrome stain for demonstrating distemper inclusion bodies in tissue sections.**—*Science.* **107.** 175. **707**

Details are given of the technique and staining reactions of Pollak's trichrome stain. In paraffin sections from cases of mink, fox and ferret distemper fixed in any of the standard fixatives, the stain gave good polychromatic differentiation between inclusion bodies and cellular elements. The sections were permanent and did not tend to decolorize on storage.—CLIVE BRIGGS.

KENNEDY, A. H. (1948.) **Studies on neurotropic distemper of foxes. The history of an outbreak of a neurotropic fox distemper among ranch raised foxes.**—*Canad. J. comp. Med.* **12.** 137–140. **708**

KENNEDY, A. H. (1948.) **Studies on neurotropic distemper of foxes. II. The symptoms observed in foxes affected with a neurotropic type of fox distemper.**—*Ibid.* 168–171. **709**

KENNEDY, A. H. (1948.) **Studies on neurotropic distemper of foxes. III. The macroscopic and microscopic pathology of a neurotropic type of fox distemper.**—*Ibid.* 203–205. **710**

KENNEDY, A. H. (1948.) **Studies on neurotropic distemper of foxes. IV. Inclusion bodies in neurotropic distemper.**—*Ibid.* 218–220. **711**

KENNEDY, A. H. (1948.) **Studies on neurotropic distemper of foxes. V. Studies on the blood taken at various periods of time before death, from foxes infected with neurotropic distemper.** —*Ibid.* 242–251. **712**

KENNEDY, A. H. (1948.) **Studies on neurotropic distemper of foxes. VI. Blood examinations of foxes that suddenly manifested convulsions and died within thirty to thirty-six hours.**—*Ibid.*—252–255. **713**

KENNEDY, A. H. (1948.) **Studies on neurotropic distemper of foxes. VII. Blood examinations of foxes that showed varying symptoms of neurotropic distemper and recovered from the infection.**]—*Ibid.* 273–277. **714**

I. An outbreak of neurotropic distemper with 80% mortality occurred on a fox farm following possible exposure to two dogs, similarly affected. The symptoms were similar to those in the dogs. Mortality continued for 29 days following vaccination with attenuated tissue vaccine.

II. Nervousness and convulsions were the major symptoms in foxes in the outbreak which was studied. Characteristic mainfestations of the disease were inappetence; dry, lustreless fur; dull, sunken eyes; a haggard expression of the face; and a dry, scaly condition of the nose and foot pads. In some instances foxes with mild symptoms would die within a short time, while other foxes with acute severe symptoms would survive for longer periods. A few animals which had mild symptoms for a few days would recover.

III. In this outbreak a toxic degeneration, with cloudy swelling, appeared to be the main pathological change, the liver, kidney and spleen being most severely affected. In the brain the only lesion recorded is engorgement of the blood vessels.

IV. Inclusion bodies were found in one or more tissues from each fox examined. The bodies were more commonly found in the trachea and bladder. In some cases they were present in abundance in the nuclei and cytoplasm of the cells in the splenic pulp. They were occasionally found in the hepatic cells, but rarely in the kidneys. Inclusion bodies were not found in the brain tissue.

V. Marked lymphopenia was the principal change noted. In some cases lymphocytes had disappeared entirely from the blood stream. The haemoglobin content of the blood was higher in foxes affected with the disease than in normal animals of a similar age.

VI. Marked lymphopenia occurred before the appearance of symptoms of the disease. The number of lymphocytes was less than half that of normal animals. Following the appearance of symptoms there was a rapid decrease in the number of these cells. The number of neutrophiles and monocytes was not affected by the disease.

VII. In foxes that recovered from neurotropic distemper lymphopenia occurred. The extent of this condition varied directly with the severity of symptoms. A steady increase in the number of lymphocytes occurred as the infected animal recovered.—P. J. G. PLUMMER.

CERNAIANU, C., & POPOVICI, I. (1944.) Beiträge zum Studium des Geflügelpestvirus und der von diesem Virus in Rumänien in den Jahren 1941 bis 1944 bedingten Krankheit. **[The fowl plague [Newcastle disease] outbreak in Roumania 1941-44.]**—*Arch. ges. Virusforsch.* **3.** 231–249. **715**

Except for a promptly eradicated outbreak of fowl plague, introduced with poultry from Italy in 1932, Roumania had been free from the disease for at least 35 years up to 1941, when a serious outbreak occurred involving fowls and other kinds of poultry. The virulence of the infection was extreme and all infected birds died from a peracute septicaemic form of the disease. Isolated virus was lethal to experimental birds in a dilution of 10^{-7}. Although this outbreak was controlled, further ones occurred at intervals up to 1944, but the potency of the virus steadily diminished during the period 1941–44. The septicaemic form was replaced by a respiratory-nervous form and later the infection in adult fowls was asymptomatic, though young birds could still be made definitely ill, experimentally.

Twenty-six isolations of the virus were made: all proved to be immunologically identical and identical with a previously known fowl plague virus. Much information is given about the nature of the virus and about the variations in symptoms and P.M. findings while the virus was undergoing natural attenuation. [The disease is now considered to have been Newcastle disease.] —J. E.

BERTHELON & TOURNUT. (1949.) La peste aviaire en France. Son identification dans la région Toulousaine. **[Fowl pest (Newcastle disease) in France.]**—*Rev. Méd. vét. Lyon et Toulouse.* **100.** 21–26. **716**

An outbreak of "fowl pest" near Toulouse is described. In the affected poultry yard there were fowls, turkeys and geese; only the fowls

were affected. The duration of disease was short and mortality in the fowls 100%.

The symptoms are described. They include somnolence, respiratory and nervous symptoms and yellow diarrhoea. The lesions included hyperaemia of subcutaneous tissues, petechiae and ulcers in the proventriculus and intestines, and small pneumonic and oedematous areas in the lungs. Experimental transmission was effected by intramuscular inoculation of a suspension of mixed spleen, liver, lung and brain tissues. The period of incubation in experimental cases varied from 2–10 days. No bacteria were isolated in cultures.

Experimental transmission by means of Berkefeld N. filtrates of tissue suspensions was effected in two fowls.

This is stated to be the first outbreak of "fowl pest" in France; no information is given as to the source of infection.

[The symptoms, lesions and period of incubation are those of Newcastle disease rather than fowl plague.]—M. C.

CUNNINGHAM, C. H. (1948.) **The effect of certain chemical agents on the virus of Newcastle disease of chickens.**—*Amer. J. vet. Res.* **9.** 195–197. **717**

The effect of exposure of Newcastle disease virus for three min. to various chemicals was tested.

The following agents completely inactivated the virus: ethyl alcohol 70%; tincture of metaphen (bisacetoxymercuri-4-nitro-2-cresol) 1:200; mercuric chloride 1:1,000; tincture of zephiran 1:1,000; phenol 3%; lysol 1%; creoline 1%; tincture of iodine 1%; sodium hydroxide 2%.

The following agents did not completely inactivate the virus in the 3 min. period, but were considered as being effective: liquor cresolis saponatus 1%; potassium permanganate 1:1,000; and formalin 10%.—F. D. ASPLIN.

SWIERSTRA, D. (1947.) Bronchitis infectiosa bij kippen in Nederland. **[Infectious bronchitis of chickens in Holland.]**—*Tijdschr. Diergeneesk.* **72.** 745–746. **718**

In experimental infections the symptoms were noisy breathing, the neck being stretched, head lifted up, and beak opened. P.M. examination revealed that the bird was well nourished; no parasites were found except an oocyst of *Eimeria tenella*. There was an increase of mucus in the trachea and necrotic foci were present in the liver. The course of this contagious disease and the speed of infection suggested that it was a virus disease similar to "infectious bronchitis" already known for over ten years in America. Mortality was nil to 3% in young adults, but greater in chickens.—J. T. GREAVES.

MARRONE, P. (1947.) Il vaccino embrionale all'idrossido di alluminio e la laringotracheite infettiva dei polli. **[Aluminium hydroxide embryonic vaccine and infectious laryngotracheitis in fowls.]**—*Zooprofilassi.* **2.** No. 8. pp. 12–13. **719**

M. obtained good results in the prophylactic inoculation of fowls against laryngotracheitis with a vaccine grown in 11-day chick embryos and adsorbed by aluminium hydroxide. Two doses were given at seven-day intervals. During epidemics, vaccinated birds had only slight malaise from which they soon recovered. Mortality in non-vaccinated birds was about 80%.

—I. W. JENNINGS.

MORGAN, H. R. (1948.) **Studies on the relationship of pteroylglutamic acid to the growth of psittacosis virus. (Strain 6BC.)**—*J. exp. Med.* **88.** 285–294. [Author's summary and conclusions copied *verbatim*.] **720**

p-Aminobenzoic and pteroic acids antagonize the inhibition of the growth of psittacosis virus (strain 6BC) by sulfadiazine in a competitive manner. Pteroylglutamic acid exerts a non-competitive type sulfonamide antagonism.

The effect of certain analogues of pteroylglutamic acid and of pteroic acid on the growth of psittacosis virus and its inhibition by sulfadiazine are reported.

The implications of these findings with regard to the possible synthesis of pteroylglutamic acid by psittacosis virus and its suggested rôle as an essential factor for growth of this virus are discussed.

BORDET, J., & BORDET, P. (1946.) Bactériophage et variabilité microbienne. **[Bacteriophage and bacterial dissociation.]**—*Ann. Inst. Pasteur.* **72.** 161–173 & 321–334. **721**

At 37°C. *Bact. coli* Lisbonne causes the lysis of *Shigella shigae* in the presence of a trace of calcium, but not at 10°C. Immune serum may neutralize any lytic substance produced, but does not inhibit the ability to produce it.

Of the three types of *Pseudomonas pyocyanea* the one producing blue green pigment exhibits spontaneous lysis which together with pigment production is inhibited by lack of calcium and low temperature. The latter does not affect future capacity to produce pigment or the development of lysis. Immune sera have no effect on lysis. The other two types do not exhibit spontaneous lysis.

It is considered that there is a close relation between bacterial dissociation and bacteriophage production, and the virus theory is discounted.

—ALAN G. WARREN.

BJÖRKMAN, T. (1947.) **Ögonrickettsios. [Rickettsial eye infection.]**—*Skand. VetTidskr.* **37.** 381–384. **722**

This review of the literature on *R. conjunctivae* infection in sheep and goats, cattle, reindeer, pigs and poultry was made after observation of a case of suspected rickettsial eye infection in a ram imported from Great Britain. B. states that although the disease has not been diagnosed with certainty in Sweden, BERGMAN'S (1912) description of outbreaks of infectious keratitis in 1909 and 1910 in Norrland appears to agree with those of later identified cases in other countries.

Methods for fixing and staining the organism from smears of conjunctival exudate are given, with a description of microscopical appearances at the various stages of infection.

Methods of transmission are discussed and the clinical picture is described in detail. B. states that no specific therapy or method of immunization is known.—F. E. W.

SMADEL, J. E., SNYDER, J. C., JACKSON, E. B., FOX, J. P., & HAMILTON, H. L. (1947.) **Chemotherapeutic effect of acridine compounds in experimental rickettsial infections in embryonated eggs.**—*J. Immunol.* **57.** 155–177. **723**

The acridine compounds used in these experiments were nitroakridin 3582 and one of its arsenical salts, rutenol. Two methods were employed for testing the action of the drugs. In one, embryonated eggs were inoculated with sufficient rickettsia to kill about half the embryos in seven days, at which time the number of rickettsia in yolk sac material in drug-treated eggs, and in controls, was estimated by microscopic examination and by titrations performed in animals. In the other, highly infectious inoculum was injected into the yolk sacs of control and drug-treated embryonated eggs, and the value of the treatment judged on the period of survival of the embryos.

The experiments indicated that both drugs had a rickettsiostatic action on *R. prowazeki*, *R. moosesi*, *R. orientalis* and *R. rickettsi*. Two other acridines, 2-amino-5-nitro-acridine and acriflavine also appeared to have some rickettsiostatic effect.

In experiments, in which half the minimal therapeutic doses of nitroacridine and *p*-aminobenzoic acid were inoculated simultaneously, there was no prolongation of the lives of the embryos over controls, and it is suggested that the mechanism of rickettsiostasis by acridines is dissimilar to that by *p*-aminobenzoic acid, and that it may depend on interference with adenine containing compounds of the organism, or host cell, similar to that postulated for bacteriostasis and inhibition of growth of bacteriophage by the acridines.

—U. F. RICHARDSON.

SMADEL, J. E., JACKSON, E. B., & GAULD, R. L. (1947.) **Factors influencing the growth of rickettsiae. I. Rickettsiostatic effect of streptomycin in experimental infections.**—*J. Immunol.* **57.** 273–284. **724**

Specimens of streptomycin, dihydrostreptomycin and other biologically active materials were tested for their rickettsiostatic effect by injecting the required dose into embryonated eggs, followed immediately by rich suspensions of various rickettsia, the results being judged by the prolongation of the life of the treated embryos as compared with controls. Streptomycin produced an inhibitory effect on the growth of *R. mooseri*, *R. prowazeki*, *R. akari* and *R. rickettsi*, but failed in respect of *R. orientalis*. Experiments in which preparations of streptomycin containing impurities were employed, and others in which the activity was reduced by treatment with semicarbazide, seemed to indicate that the antirickettsial and antibacterial effects were affected alike. Dihydrostreptomycin had less activity than streptomycin. Combined treatment with streptomycin and *p*-aminobenzoic acid gave much better results than when similar amounts of either drug were used alone. Tryptophane, riboflavin, folic acid and two of its related compounds had no demonstrable effect in the amounts used, and did not influence the rickettsiostatic effect of *p*-aminobenzoic acid.

—U. F. RICHARDSON.

See also absts. **741** (venereal granuloma in dogs); **812** (foot and mouth disease).

IMMUNITY

FRIEDEMANN, U. (1947.) **Dynamics and mechanism of immunity reactions *in vivo*.**—*Bact. Rev.* **11.** 275–302. **725**

The potency of immune serum is usually assessed by mixing pathogenic agent and serum *in vitro* and injecting the mixture into the experimental animal. This procedure differs from the prophylactic and therapeutic administration of serum where the reaction between the two components takes place in the body. Little is known of the mechanism of this *in vivo* aspect of immunology.

The necessary therapeutic dose of serum is often found to exceed the neutralizing dose by a considerable amount and the ratio between these doses was determined experimentally for various pathogenic agents. With diphtheria toxin the ratio was found to depend on the distribution of

antitoxin between blood and tissue. Individual tetanus toxins were found to unite with nerve tissue to different extents before reacting with antitoxin and this gave varying values to the ratio. It was shown that this toxin travels by way of the peripheral nerves to the central nervous system, while diphtheria toxin is carried in the circulation.

Wide variation was found between the neurotropic viruses of rabies and equine encephalomyelitis and it was found that although rabies virus unites with dilute antibody *in vitro*, the encephalomyelitis virus is only neutralized by undiluted antiserum.

When the result of a test depends on the concentration of antitoxin at the site of toxin injection the result is influenced by capillary permeability and the effect of several substances on capillary permeability was determined. It was also shown that in the rabbit and g. pig the cerebral capillaries are permeable to antitoxins.—K. G. T.

Baer, H., Dische, Z., & Kabat, E. A. (1948.) **Immunochemical studies on blood groups. VIII. The methylpentose contents of hog and human blood group A and O substances and their relationship to cross-reactivity with type XIV antipneumococcus horse serum.**—*J. exp. Med.* **88.** 59–63. [Summary copied *verbatim.*] **726**

It has been possible, by employing a new color reaction for methylpentoses, to determine the fucose content of individual hog and human blood group A, B, and O substances. The data indicate an inverse correlation between fucose content of the hog A and O substances and ability to cross-react with Type XIV antipneumococcus serum. The human A, B, and O substances display no correlation between their fucose content and ability to cross-react with Type XIV antipneumococcus serum.

Chow, B. F., Homburger, F., DeBiase, S., & Petermann, M. L. (1948.) **A clinical method for the determination of human albumin by means of a precipitin reaction.**—*J. Lab. clin. Med.* **33.** 1052–1058. [Summary copied *verbatim.*] **727**

The results of routine estimation of human albumin by different methods were compared. It was found that the immunologic method appeared to be superior to the chemical methods and gave reliable results with sera containing different amounts of albumin. Because of the minute quantity of albumin required for each analysis and the specificity of the test, the immunologic method also has been found useful to estimate the excretion of albumin in the urine of nephrotic patients and to determine the amount of albumin in the spinal fluid.

Goret, P., & Bardach, M. (1947.) Recherches sur la toxicité et la détoxication des sérums. I. Sérum de boeuf. **[The toxicity and detoxication of sera. 1. Bovine serum.]**—*Rev. Immunol. Thérap. antimicrob.* **11.** 276–290. **728**

The authors review relevant French literature and give their own findings on the effect of varying doses [0·5–20 ml.] of fresh bovine serum injected into g. pigs by five different routes [intravenous, intramuscular, intradermal, intraperitoneal and subcutaneous]. Both local and general reactions are described. No significant variation between the toxicity of sera from different donors was found.

Serum after treatment by one of four methods was again assayed on g. pigs. Method (1) consisted of aging the serum for varying periods up to 45 days. A progressive feeble attenuation occurs, particularly with regard to general reaction. Method (2) comprised heating to 56°C. for 1–3 hours and to 37°C. for 19–48 hours. An insufficient attenuation occurred affecting local reaction more than general. Method (3) involved exposure of serum to formol 1 : 3,000 to 1 : 500 for periods 1–57 hours. The results were similar to method (1). Finally heat and formol treatment were combined 1 : 3,000 to 1 : 500 formol for 1–2 hours at 56°C. and 1–24 hours at 37°C. This gave excellent detoxication and satisfied the authors' critical test —survival after injection of 10 ml. serum intravenously. This effect was not obtained if the serum were heated and allowed to cool before addition of formol. The authors' final recommendation in the treatment of serum was 1 : 3,000 formol for 13 hours at 37°C. or 1 : 1,000 formol at 56°C. for 2 hours.

[It is not stated whether the survival times are the means of many assays or of only individual animals.]—R. J. Fitzpatrick.

Goddard, J. W. (1947.) **Granuloma, a characteristic "qualitative" change in focal anaphylactic inflammation.**—*Amer. J. Path.* **23.** 943–965. **729**

Anaphylactic inflammatory changes differed from non-anaphylactic both quantitatively and qualitatively in test g. pigs. The quantitative changes had already been described in the literature. The qualitative changes were characterized by complete local resorption of the specific antigen and by a histiocytosis, the latter manifesting itself most frequently in the formation of granulomata. These were perineural or perivascular or perhaps developed in and around adipose lobules. Size and shape were variable; coalescence was frequent. The predominant cell of the granulomata was the histiocyte with a pleomorphic tendency. Syncytia, epithelioid cells and giant cells were sometimes found, and lymphocytes,

plasma cells and eosinophile polymorphs might be intermingled with the histiocytes. The initial histogenic changes were endothelial, perithelial or both. The usual sequel was fibrosis which was sometimes followed by mucoid or myxomatoid degeneration. Local injections of non-specific antigen did not induce granulomata except when, by repeated injections, they became specific.

—L. M. Markson.

See also absts. **638** (swine erysipelas); **653-655** (brucellosis); **688** and **689** (foot and mouth disease); **690** (rabies); **698-702** (rinderpest); **719** (laryngotracheitis).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Furman, D. P. (1947.) **Benzene hexachloride to control cattle lice.**—*J. econ. Ent.* **40.** 672–675. [Author's summary copied *verbatim*.] **730**

Louse infestations of *Haematopinus eurysternus* and *Linognathus vituli* were eradicated by 1 dip in a 0·3 per cent suspension of benzene hexachloride (equivalent to approximately 0·036 per cent gamma isomer). *Bovicola bovis* infestations were eliminated by a single dip in 0·15 per cent benzene hexachloride. The toxicity of benzene hexachloride to cattle lice was manifested in 3 ways: 1. By complete kill of all motile stages. 2. By a rather high ovicidal action. 3. By failure of any emerging nymphs to survive on the treated animal.

Evidence was presented that a prepared suspension of benzene hexachloride retained its effectiveness in a field vat for at least 38 days.

Akchurin, B. S. (1945.) [*Rhinoestrus* **infestation of horses in Bashkir.**]—*Veterinariya, Moscow.* No. 6. pp. 21–22. **731**

A. describes the life history of the oestrid *R. purpureus* in horses in Bashkir. The animals affected were usually weak and emaciated. Diagnosis of infestation can usually only be made by finding the larvae.

The author speaks of routine irrigation of the nasal passages and the use of a repellent ointment applied to the muzzle in the fly season.—L. L.

Olson, T. A., & Dahms, R. G. (1946.) **Observations on the tropical rat mite, *Liponyssus bacoti*, as an ecto-parasite of laboratory animals and suggestions for its control.**—*J. Parasit.* **32.** 56–60. **732**

A heavy infestation of the mite *Liponyssus bacoti* occurred in the animal house containing hamsters, rats and mice, at a medical laboratory in Texas, U.S.A. Hamsters were particularly susceptible and several died. Rats, mice and g. pigs placed in infested cages after dead hamsters had been removed died in a few days or hours. Death in these animals was apparently due to exsanguination and not to transmitted disease or to the direct toxic effects of the bites.

D.D.T. was successfully used to eradicate the mites. Previous tests had indicated that 25 mg. D.D.T. applied externally as a xylene emulsion to adult mice produced tremors, as seen in cases of D.D.T. poisoning, but not death unless application was repeated several times. 10% D.D.T. in talc was however chosen, and was applied in the cages to fresh bedding consisting of fine wood shavings. By such treatment the rat mites were eradicated for at least six weeks. No ill effects were caused to rats or hamsters, but 80% of the female mice in the breeding colony were killed, leading to loss of unweaned young during the following 11 days. No male mice died.

—L. Davies.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Olsen, O. W. (1947.) **Hexachloroethane-bentonite suspension for controlling the common liver fluke, *Fasciola hepatica*, in cattle in the Gulf Coast region of Texas.**—*Amer. J. vet. Res.* **8.** 353–366. **733**

A comprehensive report of large-scale trials of hexachloroethane in Texas. The author's suspension of hexachloroethane 500 g., bentonite 50 g., and water about 750 ml. sufficient to make a total volume of one l., was used. The dose of this suspension for adult cattle was 200 ml. containing 100 g. of hexachloroethane, and for yearlings half this amount. Treatment was by single dose without any preparation of the animals.

In a first trial 463 adult cattle which all had liver fluke infestation were treated, and on examination two to three weeks later 35 of them were still affected, as judged by egg count examinations. There was no connection between persistence of infestation and its original intensity.

Further trials were carried out on two large herds of cattle on permanent pasture. Each herd was given two treatments annually for three years by the same single dose technique. The initial degree in infestation in both herds was very high—over 75%, and although the treatment brought about a great reduction, the incidence fluctuated considerably, being low soon after treatment and as high as it was originally in between treatments, so that there was no permanent benefit.

In order to find out more precisely the effect of the suspension, 148 adult and 29 young cattle

were treated two weeks before slaughter and were examined after slaughter together with cattle which had not been treated. 85% of the untreated cattle had flukes and only 44% of the treated ones. The untreated cattle had an average of 24 flukes each, and the treated ones an average of three flukes each. Tested statistically this indicates a very definite anthelmintic action by hexachloroethane. The above figures apply to both adult and immature flukes, the latter being well known to be resistant to hexachloroethane. Only a very few adult flukes were found in the treated cattle, and these were limited to livers which had become seriously damaged. It was found that calves with fresh infestations could readily be rid of flukes by hexachloroethane treatment.

The effect of treatment on the weights of cattle was examined. Figures are given for weight gain over a seven-month period for treated and untreated cattle. There appeared to be an unfavourable effect of treatment, but this cannot be regarded as significant owing to uncontrolled variables.

It was definitely established that hexachloroethane treatment could bring about marked clinical recovery in cattle with severe liver fluke infestation.

In weak animals there was sometimes dizziness, drowsiness and lack of appetite, some animals already recumbent remained down for some time, and some appeared to be narcotized for a few hours, and a few animals failed to rally after treatment, and died. P.M. examination of such cases typically did not reveal serious damage to the liver, but showed signs of irritation to the kidneys. In general, the mixture was remarkably non-toxic: this was ascribed to the use of bentonite which was adopted to serve both as a suspending and an adsorbing agent.

The paper is concluded by advice for the control of liver fluke disease under conditions present in Texas.—J. E.

MIKAČ Ć, D. (1942.) Dopuna helmintskoj fauni naših domaćih sisavaca 1. [**Additional notes on the parasitic fauna (helminths) of domestic mammals.**]—*Vet. Arhiv.* **12.** 416–420. [French summary.] **734**

Large numbers of *Echinochasmus* and *Globocephalus* were found in several pigs and horses.

—K. J. SINCLAIR.

BRIZARD, A. (1943.) Brèves notes de parasitologie. [**Notes on parasitology** (*Psoroptes equi, Joyeuxiella pasquale, Ascaridia columbae*).]—*Rev. Méd. vét., Lyon et Toulouse.* **94.** 209–212. **735**

Three instances of parasitic infestations of unusual interest are described.

In a case of psoroptic otacariasis in the horse, *Psoroptes equi* was found in the discharge. This condition was believed to be invariably caused by *Psoroptes hippotis*, and it was further considered that *Psoroptes equi* was not able to establish itself in the ear. *Psoroptes hippotis* differs morphologically from *Psoroptes equi* mainly in having two bristles on its posterior aspect as opposed to three in the case of *Psoroptes equi*. Full details and measurements of the chief morphological features of both species are given.

Six tapeworms, found P.M. in the small intestine of a cat, were identified as *Joyeuxiella pasquali*. This is stated to be the first time this species has been reported from France.

Two fully developed specimens of *Ascaridia columbae* were recovered from the mucous membrane of the gizzard of a pigeon. This nematode is not infrequently discovered in organs other than its normal habitat, the small intestine.—D. W. J.

EDWARDS, J. T. & Imperial Bureau of Agricultural Parasitology. (1947.) **I. Phenothiazine in veterinary medicine. A review of the literature of 1942-46. II. Bibliography of phenothiazine as an anthelmintic, 1942-46.** [Joint Publication No. 12. Imperial Agricultural Bureaux.] pp. 36. Weybridge: Imperial Bureau of Animal Health. **736**

I. The author of the review has presented a comprehensive practical survey of phenothiazine (thiodiphenylamine) therapy in domestic animals. The chemical structure of the compound, the mode of action and the excretion products are discussed. The effect of the administration of small repeated sub-curative doses of phenothiazine was studied in controlling the degree of helminth infestation and, particularly, egg production.

In regard to toxicity no minimal toxic or lethal dose is known for any farm animal; in this connexion the reactions of the various species to the drug are discussed. It is recommended that phenothiazine should not be administered to very young animals or to those in very poor condition.

Phenothiazine is probably the most important veterinary anthelmintic for nematode infestations; it can easily be administered and when given according to the general practice toxic effects are rare. Details are given of dosage, effect of climate and farming practice, hazards, etc., in general.

In particular there are sections devoted to detailed study of phenothiazine therapy in (a) sheep, (b) horses, (c) cattle, (d) pigs, (e) goats, (f) fowls, (g) other animals, (h) non-helminthic diseases of domestic animals, (k) helminthiasis in man. The species of worms parasitic in the various species of animals and the results of treatment with phenothiazine are given in tables.

II. A comprehensive list of references, 1942–1946, is given as a continuation of the Bibliography of Phenothiazine as an Anthelmintic, published by the Imperial Bureau of Agricultural Parasitology (Helminthology) in 1942.—E. M. J.

SLAGSVOLD, L. (1946.) Snylterplagen host hest. [**Parasites of horses.**]—*Norsk VetTidsskr.* **58.** 2–18. **737**

The commonest parasites of horses in Norway are described, the symptoms, methods of diagnosis, treatment and control being discussed in connexion with the most important of them. S. is mainly concerned with helminths, especially strongyles and ascarids. The same treatment is recommended for *Gastrophilus* larvae as for *Ascaris equorum*: carbon disulphide 7–10 ml. for foals and 15–25 ml. for adult horses (5 ml. per 100 kg. bodyweight), 15–20 ml. for pregnant mares, given by stomach tube, stirred with a little water, the animal having been starved for 24 hours beforehand and kept without food or water for three hours after treatment. The dose should be repeated after 2–4 weeks, when any remaining larvae will have reached the intestine. If carbon disulphide is unobtainable pure carbon tetrachloride (10 ml. per 100 kg. body weight) may be used instead, but it is said to be less safe. This should be followed immediately by a purgative.

For strongyles (the *Trichonema* group, *Strongylus vulgaris*, *S. edentatus* and *S. equinus*), the efficacy of the various remedies is discussed. Methylene blue, 2–4 g. *per os* daily for 3–5 days may be tried as preliminary treatment for very anaemic horses. Phenothiazine as used by FLATLA [*V. B.* **16.** 412.] is recommended, although its toxicity is emphasized. S. points out, however, that under the Norwegian insurance scheme for livestock the risk of systematic anthelmintic treatment for horses is taken, provided that veterinarians use the prescribed remedies in the stated doses.

The importance of stable hygiene in helminth control is stressed.—F. E. W.

GORDON, H. McL. (1948.) **The epidemiology of parasitic diseases, with special reference to studies with nematode parasites of sheep.**—*Aust. vet. J.* **24.** 17–45. **738**

This is a lengthy and comprehensive paper, the substance of which was presented at the annual meeting of the Australian Veterinary association in 1947. The original portions are based on field studies on the epidemiology of diseases caused by strongyloid nematodes of sheep. The discussion is divided into sections according to a division of the life-cycle into two stages and two phases—the parasitic stage and the free living stage, and the contamination phase and the infection phase.

The aspects of domestication which have contributed to the disturbance of host-parasite relations with consequent building up of dangerous worm burdens are briefly discussed. The types of life-cycle are summarized according to the outline in Introduction to Nematology (Chitwood *et al.*) [*V. B.* **11.** 575]. Stress is placed on the change of concept of the free living stages, from a " static " concept, the maximum longevity, to a " dynamic " concept, the mortality rate. There is a short note on the origins of epidemics, considered from the point of view of diseases caused by helminth parasites of sheep.

The stages and phases of the life-cycle of strongyloid nematodes of sheep are then discussed under sub-headings which designate factors which influence the stage or phase epidemiologically. The factors discussed under the parasitic stage are anthelmintics, resistance and " self-cure ". Experiments are described which illustrate the effect of plane of nutrition on resistance to *Haemonchus contortus*, and an apparently specific effect on *Oesophagostomum columbianum* obtained by grazing sheep on a growing oat crop. A number of instances of the occurrence of self-cure in sheep in field trials are given and the results of specific trials are presented. It is stated that " it appears that self-cure is not a resistance phenomenon, that it is not related to the age of the worms, and that it is not necessarily due to a sustained improvement in the level of nutrition. It appears to be closely related to periods when the pastures have freshened, and the fact that it has been seen simultaneously on grazings several miles apart and of very different botanical composition, and in sheep subsisting chiefly on an oat crop for grazing, suggest that self-cure may be caused by something of an ' anti-helmintic ' nature present in rapidly growing plants ".

The contamination phase is discussed under the headings, strategic and tactical drenching, stocking and movement-rotation. Strategic and tactical administration of anthelmintics is based on epidemiological observations which have established seasonal patterns of changes in the worm burden with different species of helminths. The free living stage is given general consideration and it is pointed out that " emphasis on the great longevity of free living stages and unwarranted acceptance of the efficiency of anthelmintics suggested that the pasture was the reservoir of infection, rather than the sheep. If a pasture is rested for a few weeks most of the free living forms are destroyed, whereas even a lightly infested sheep may be distributing millions of worm eggs

daily". The results of epidemiological studies in the field are introduced by means of bioclimatographs which present climatic data in relation to the seasonal changes in numbers and geographical distribution of *H. contortus* in Australia. The seasonal changes in *H. contortus*, *Trichostrongylus* spp., *Oes. columbianum* and *Dictyocaulus filaria* are discussed in some detail.

The infection phase is discussed from the point of view of the timing of tactical anthelmintic treatment, meteorological considerations, the behaviour of the host animal and nutritional conditions.

The paper is illustrated by a number of graphs and diagrams and there are over 80 references.—H. McL. GORDON.

WHITTEN, L. K. (1947.) **Parasitism in relation to pasture farming.**—*Proc. 7th ann. Conf. N. Z. Soc. Anim. Prod.*, *1947*. pp. 129–134. Discussion pp. 135–136. [Mimeographed.] **739**

This is a paper in popular language describing the host-parasite relationship under New Zealand grazing systems. Stress is laid on control measures based on adequate nutrition, alternation of animal species and of young and old animals, the weaning of lambs on to crops, new pastures or rested pasture, and rotational grazing.—J. F. F.

MADSEN, H. (1945.) **The species of Capillaria (Nematodes, Trichinelloides) parasitic in the digestive tract of Danish gallinaceous and anatine game birds, with a revised list of species of Capillaria in birds.**—*Dan. Rev. Game Biol.* **1.** 1–112. [In English.] **740**

This is a systematic zoological description of the various *Capillaria* species that occur in certain birds.—D. LUKE.

See also abst. **851** (incidence of liver flukes).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

LESBOUYRIES, G. (1946.) Néoplasies vénériennes du chien et de la chienne. [**Venereal granuloma of the dog.**]—*Rec. Méd. vét.* **122.** 5–19. **741**

A general account of the disease.

L. states that the nature of the tumour is doubtful. JACKSON [1936], considers that it arises from neither connective nor epithelial tissue, but that it has a neuroectodermic origin, such as was seen in two cases of tumours of the heart in dogs in South Africa.

L. advances evidence both for and against the theory that these tumours are caused by a virus.—M. R. ORMEROD.

FIELD, J. B. (1948.) **Prothrombin activity in rats with mammary tumors.**—*Cancer Res.* **8.** 172–176. [Author's summary copied *verbatim*.] **742**

The presence in the rat of spontaneous mammary tumors causes a reduction of the normal prothrombin time (12·5 per cent plasma). The hypoprothrombinemia induced by a standard dose (2·5 mgm.) of the anticoagulant, 3,3′-methylenebis (4-hydroxycoumarin), is considerably less in rats with mammary tumors than in non-tumorous controls. The presence of mammary tumors in rats appears to be associated with an increase in the size of the liver and pituitary gland. There is some correlation between the weight of the mammary tumor and weight of liver and pituitary gland. The hyperplastic liver is composed of microscopically normal hepatic cells and the moisture and total lipids are within normal limits. Following excision of the mammary tumor, the prothrombin activity and the extent of induced hypoprothrombinemia increased to levels resembling those obtained from normal rats. Similarly, the weights of the liver and pituitary gland were similar to those of non-tumorous rats.

The hepatomegaly and prothrombin response observed in rats with mammary tumors is similar to data obtained from lactating rats and rats treated with the hormone, prolactin. Rats with mammary tumors are not less susceptible to the hepatotoxic and lethal action of chloroform.

PULLINGER, B. D. (1947.) **Cystic disease of the breast. Human and experimental.**—*Lancet.* **253.** 567–572. [Summary slightly modified.] **743**

Cystic disease of the breast in women and the cystic changes produced experimentally in animals are comparable. Discrepancies exist in the interpretation of the way the cysts develop. Both conditions are probably brought about by excess of oestrogen acting on mammary epithelium that responds atypically. The decisive factor is not merely excess or imbalance of oestrogen but the nature of the parenchyma. Cystic disease of the breast is an entity independent of mammary cancer. It does not predispose to mammary cancer of mice when the cancer is activated by the tumour agent. Its relationship to chemical carcinogens remains to be determined.

RILEY, J. F. (1948.) **Retardation of growth of a transplantable carcinoma in mice fed basic metachromatic dyes.**—*Cancer Res.* **8.** 183–192. [Author's summary copied *verbatim*.] **744**

Addition of basic lead acetate or basic metachromatic dyes to the suspension of the cells of the 2146 transplantable mouse carcinoma prior

to its inoculation into the inbred mice resulted in the retardation of growth of the transplants. In contrast, repeated remote subcutaneous injections of these compounds into mice following routine transplantation of the tumor failed to affect its subsequent growth. When, however, 41 basic dyes in 0·3 per cent concentration in powdered rat cubes were fed to mice bearing the 2146 carcinoma, neutral violet and neutral red were found to inhibit the growth of the tumor and stained it crimson. Faint blue-green staining and slight inhibition of the tumor were also obtained with ethyl violet. As has recently been reported elsewhere, the feeding of Nile blue was similarly found to cause inhibition of tumor growth and to stain the carcinoma a diffuse blue. The inhibition of growth and *in vivo* staining by these dyes were much reduced when the transplantable mouse sarcoma 180 was employed. The results of this and similar experiments are briefly discussed.

Ostenfeld, J. (1942.) **On the metastasis problem.**—*Acta path. microbiol. scand.* **19.** 209–219. [In English: author's summary slightly modified.] **745**

Transplantable tumors may be transmitted by homologous transplantation of apparently metastasis-free organs from tumor-bearing animals. Of the various organs, the lung is the one that most often gives the take (retention of tumor cells in the lung capillaries). The number of takes seems to depend on the dose of organ employed. The course of the take is to be looked for in the tumor cells scattered diffusely in the respective organs. It is *not* a question of any cancer virus. When the organ dose is decreased considerably, *no* take appears. Active tumor cells are demonstrable in the blood stream.

The number of tumor cells required for a take is not known. Probably the tumor cells present in the organs originate from the invasive inoculation tumor in the subcutis. A small number of these cells may possibly have been carried to the organs at the time of the inoculation or very soon after. In a few cases the prolongation of the life of the animals by radical removal of the inoculation tissue gives rise to the formation of metastases in the lungs, undoubtedly because in these cases there has been *time enough* for the metastases to develop. A large part of the tumor cells may reasonably be assumed to perish or live in a latent state for some length of time without attaining further development. Methylcholanthrene appears to some extent to be able to shift the balance between tumor cells and the organism of their host.

Beck, L. V., & Fisher, M. (1946.) **Physiological studies on tumor-inhibiting agents. II. Effect on rectal temperatures in normal rabbits of the *Serratia marcescens* tumor-necrotizing polysaccharide of Shear.**—*Cancer Res.* **6.** 410–420. [Summary copied *verbatim*.] **746**

The tumor-necrotizing polysaccharide employed in the present experiments produced measurable increases in rectal temperature in the rabbit when given intravenously in amounts as low as 0·005 μgm. per kgm. An elevation of from 2 to 3°C. was usually produced when the polysaccharide was given intravenously in amounts equal to or greater than 0·5 μgm. per kgm. This elevation was generally accompanied by diarrhea. Death occurred in some of the rabbits given 20 to 100 μgm. of polysaccharide per kgm. The rabbits that died usually had a rather weak febrile reaction and greatly diminished muscular strength. In all cases death occurred in less than 24 hours after the injection. The 2 rabbits that died during the experiment went into convulsions, and 1 bled at the nose and mouth. The febrile reaction was intensified and prolonged on very warm days. Elevation of the rectal temperature did not occur as long as the rabbit was tied down on a copper table, or cooled with iced water and cold air. It was possible to minimize the febrile reaction with the following drugs, in amounts that were not acutely toxic to the rabbit: antipyrene, isopropyl antipyrene (larodin), acetyl salicylic acid (aspirin), and dial. A number of other drugs, when used in the amount and manner specified, were ineffective.

NUTRITIONAL AND METABOLIC DISORDERS

Edited by Stefferud, A. (1948.) **U.S.A. Grass. Yearbook of Agriculture 1948—United States Department of Agriculture.** pp. xiv+892. Washington: U.S. Government Printing Office. $2.00. **747**

This work is written primarily for farmers and deals very comprehensively with all the aspects of growing and utilizing grass.

It is arranged in four main parts. The first headed "Grass in the Nation's Life" deals with grasses generally with emphasis on soil conservation and on livestock. The chapter on grass as forage for livestock in this section is of particular interest to veterinarians; it extends to 45 pages, and is divided into eight sections dealing with grass as it affects beef and dairy cattle, horses, sheep, pigs, poultry, etc. The next section deals with the varieties of grasses grown and used in the various regions of the United States. The third part deals with identification of varieties of grasses, legumes and associated plants. The final section consists of tables, charts, lists of plant names, etc.

The whole forms a very readable and complete account of pastures in the United States and will be valuable to a great variety of readers.

—M. C.

MELLANBY, E. (1944.) **Nutrition in relation to bone growth and the nervous system.**—*Proc. Roy. Soc.* Ser. B. **132.** 28–46. **748**

Preliminary observation of vitamin A deficient dogs had demonstrated inco-ordination of movement and impairment of vision and hearing, and subsequent examination of the nervous system revealed nerve degeneration to a large extent commensurate with these findings. It was, however, impossible to associate these lesions with a toxic condition due to deficiency of vitamin A in the diet as only particular groups of nerve cells were affected.

Attention was later directed to examining the nerves of the ear *in situ*, when it was discovered that the degeneration was attributable to overgrowth of bone pressing on the nerves, and a similar cause was found to be responsible for lesions in other areas. Anatomical considerations relative to proximity of bone, point to the reason why some parts of the nervous system were affected more than others, to which can be added evidence that motor nerves in general appear more resistant to mechanical pressure. An additional factor, particularly in regard to involvement of the optic nerve, was an increase in cerebro-spinal fluid—a sequel to pressure in other areas.

The nature of the bony overgrowth is not simple. If it can be assumed that normal growth of bone about a contained tissue such as the C.N.S. allows also for the growth of that tissue, osteoclastic activity can be viewed to be more active on the inner side of the bones and osteoblastic on the outer side. In the cases under review it has been demonstrated that although there was no decrease in bone cell activity there was, in effect, a reversal of position of osteoclast and osteoblast, resulting in bone hypertrophy on the side adjacent to the nerve elements, this being the cause of the pressure, and an increased proportion of cancellous bone more externally. Vitamin D was shown to have no effect on this hypertrophy, but M. concludes by drawing attention to the interdependence of vitamins A and D in bone growth.

The findings leading to these overall conclusions are described in detail and excellent figures lend force to the story.—C. W. OTTAWAY.

RICHET, C. (1948.) Les antialiments. [**"Antialiments".**]—*Bull. Acad. Méd. Paris.* **132.** 356–361. **749**

R. reviews the problems concerning the physiology and pathology of nutrition. There are substances which hinder the functions of the proximate principles of food in normal metabolic processes and the action of these substances may be either physical, chemical or biological.

The physical action may be of two kinds :– (a) *e.g.*, animals lose weight when fed pure cellulose in addition to a balanced diet just sufficient to maintain weight. The cellulose is not absorbed and hastens peristaltic action and evacuation. In human beings also cellulose behaves similarly as an anti-metabolic substance. (b) *e.g.*, The intake of indispensable water, if it is cold, means a removal of calories.

Regarding the chemical action, phytic acid contained in the bran of wheat hinders the assimilation of calcium ; oxalic acid in sorrel and rhubarb precipitates calcium and prevents its metabolism. The theory that iron of the alimentary tract may be precipitated in the form of an insoluble sulphide, therefore unassimilated, is mentioned. Biotin, one of the vitamins of the vitamin B complex, may be neutralized by combination with avidin from the white of egg.

Of the biological action mention is made of two examples. By the addition of indole-acrylic acid to a medium containing tryptophane which supports the growth of certain organisms, growth is inhibited, but if more tryptophane is added growth begins again. If a g. pig is given an excess of vitamin D, as cod-liver oil, and at the same time enough vitamin C for a normal g. pig, the animal develops scorbutic lesions.

R. also discusses in some detail the action of these "antialiments" on various nutritive substances, including the heat-producing principles, minerals and especially the vitamins.—E. M. J.

HADERER, J. (1944.) Der Vitamin-C-Gehalt des Hundeharnes nach der Tillmannschen Titrationsmethode. [**Vitamin C content of urine of dogs determined by the Tillmann titration method.**]—*Inaug. Diss. Vienna.* Abst. in *Wien tierärztl. Mschr.* **34.** 186. **750**

After description of the technique the results of examination of urine from 50 dogs are given. The vitamin C content varied between 0·36 and 0·68 mg. %. Two sources of error must be eliminated—use of stale samples of urine, which give erroneously low values, and omission of preliminary treatment of the urine by 10% mercuric acetate, without which the end values are ten times or more too high.—J. E.

SPINKS, J. W. T., O'NEIL, J. B., JOWSEY, J. R., LEE, C. C., & READE, M. (1948.) **The use of radiophosphorus, P^{32}, to measure phosphorus utilization by laying hens.**—*Canad. J. Res.* Sec. D. **26.** 163–176. **751**

P^{32} was fed either in repeated doses or as a

single dose to laying birds. It was deposited in the egg within 24 hours of feeding. The maximum recovery of P^{32} following a single feeding was within 24 hours in the shell, 48–72 hours in the white and 144 hours in the yolk. A large portion of the unabsorbed phosphorus was excreted within 24 hours. A considerable quantity absorbed by the digestive tract was found to be stored in the tibiae at least 40 days later. The percentage uptake of phosphorus from the tricalcium phosphate rose gradually in the egg and became relatively constant in about 14–15 days after the first feeding.

—R. Gwatkin.

Waugh, R. K., Hauge, S. M., & King, W. A. (1947.) **Choline studies with young dairy calves. I. Relation of the choline content of colostrum and calf blood.**—*J. Dairy. Sci.* **30.** 457–461. **752**

The choline content of colostrum at the first milking was high (0·69 mg. choline chloride per ml.) compared with subsequent milkings (0·17 mg. per ml. at the sixth milking). The choline content of calf blood was apparently influenced by the amount of this substance in the colostrum since a fairly rapid rise in concentration in the blood was found two days after birth, when the choline content of the colostrum was high, some increase being observed throughout the first week.

—R. Marshall.

Krupski, A., Almasy, F., & Ulrich, H. (1947.) Weitere Beobachtungen über Mangelerscheinungen beim Jungrind. [**Further observations on signs of deficiency in young cattle.**]—*Schweiz. Arch. Tierheilk.* **89.** 269–285. **753**

Krupski *et al.* [see *V. B.* **12.** 229] describe a disease in calves after they are weaned and are given dry fodder, the condition appearing at the seventh to the eighth month up to one and a half years of age. The authors now report further cases.

Food consumption and weight records are given for the periods of treatment, together with calcium-, magnesium-, and phosphorus-balance data.

The authors found a substantial fall in the urinary phosphorus concentration, with inverse changes in calcium and magnesium concentrations, as the condition developed. The administration of milk, together with a vitamin preparation and NaH_2PO_4, or the return of the animal to fresh pasture, reversed these changes.

It is suggested that the illness was due to failure to utilize the food taken and not to actual deficiencies of the latter.—J. T. Abrams.

Hanawalt, V. M., & Sampson, J. (1947.) **Studies on baby pig mortality. V. Relationship between age and time of onset of acute hypoglycemia in fasting newborn pigs.**—*Amer. J. vet. Res.* **8.** 235–243. **754**

Pairs of unweaned pigs were removed from the sow at times varying from birth to ten days after. They were allowed water but no food and were killed when they became comatose. Litter mates left on the sow served as controls.

The authors found that the highly susceptible period was during the first seven days, when there was a steady increase in the time between commencement of fasting and onset of coma. This time was under 30 hours in the newborn piglet and from 8–9 days in piglets removed at six days old. After that time the authors found it difficult to induce the condition.

The blood sugar figures for comatose piglets varied. Newborn piglets had a figure of 10 mg. per 100 ml. whilst in the six-day-old piglets a blood sugar concentration of the order of 80 mg. per 100 ml. was maintained for "several days"; when the value fell to 50 mg. per 100 ml. coma commenced.

The findings for piglets from birth to ten days are expressed graphically.—J. A. J. Venn.

Klarenbeek, A. (1947.) **Fright disease and alimentary intoxication.**—*J. Amer. vet. med. Ass.* **111.** 49. **755**

A short note on canine hysteria, especially with regard to its incidence in Holland.

K. gives the results of experiments carried out intermittently in Holland since 1927. The condition has been induced in healthy dogs, of both sexes and of various ages, by feeding certain batches of dog biscuits containing meat, heat dried Argentine meat, dried and powdered meat of Dutch animals, and dog biscuits without any animal matter. Dog biscuits containing the neurotoxic factor remain toxic for years. The nervous symptoms appeared on the average seven days after feeding the toxic food but one case developed after only two days. Milk, fresh meat, cod-liver oil, yeast or mineral salts in a ration containing toxic flour did not delay the symptoms or alleviate the condition following the onset of the symptoms. Dogs were not protected by one or more attacks of the condition.

It is concluded that the condition is not due to allergy, nutritional deficiency or to infection, but may possibly be a form of poisoning due to a factor in the flour.—F. R. Bell.

Carlos, A. S. (1947.) **Dog-biscuits. I. Hard biscuits and the canine diet. II. Raw materials. III. Manufacture and plant.**—*Food.* **16.** 43–44; 97–98; 124–125. [Abst. in *Nutr. Abstr. Rev.* **17.** 279. (1947), copied *verbatim.*] **756**

I. This general account of the manufacture and composition of dog biscuits includes a table,

adapted from French authors, of the nutritive requirements of dogs for maintenance and work, and one giving the composition of 6 types of biscuit and biscuit meal. Most plain dog biscuits consist mainly of low-grade flour and are intended to supplement the ration. Meat biscuits contain meat scrap or greaves, or meat and bone meal. Miniature biscuits contain a variety of flavouring and colouring agents. Biscuit meals are prepared from waste and broken biscuits to which 10 per cent. of meat or meat substitute, containing meat-meal, is added. The values given for the carbohydrate content of dog foods range from 18·3 per cent. in miniature meat biscuits to 79·5 per cent. in plain biscuits, the protein from 3·7 per cent. in plain biscuits to 48·4 per cent. in miniature meat biscuits, the fat from 1·5 per cent. in plain biscuits to 14·1 per cent. in miniature meat biscuits.

II. Flour used for the manufacture of dog biscuits is usually low-grade dark flour blended to contain a minimum of 25 to 30 per cent. of gluten, or white flour damaged in storage or transit. Sweepings from granaries should always be regarded with suspicion because of contamination with foreign matter. Meat used in dog biscuits and meal is usually derived from "greaves", a by-product of the fat-rendering industry which is prepared from carcases unfit for human consumption and from restaurant waste. Meat and bone meal, liver meal and bloodmeal are often incorporated in dog foods, and flavouring and colouring agents are often used to make the food attractive.

III. This article describes the process of manufacture of hard biscuits. The following stages are listed: weighing the ingredients, mixing and kneading, rolling and sheeting the dough, stamping the dough, baking, drying and cooling (often carried out in rooms heated by waste heat from the baking ovens), sorting and packing, and the manufacture of biscuit meal from broken biscuits.

McClymont, G. L., & Hart, L. (1947.) **Studies on nutrition of poultry. I. Investigations on the inadequacy of high wheat content rations for hatchability in white Leghorn pullets.**—*Aust. vet. J.* 23. 247–253. **757**

These investigations were undertaken because low hatchability was reported in the field in flocks fed abnormal rations owing to shortage of mill offals, meatmeal and green foodstuffs. The basal ration contained over 90% wheat. Riboflavin deficiency appeared to be the major limiting factor, resulting in "clubbed down", chondrodystrophy and parrot beak in many dead embryos. Manganese was adequate. The requirement of "animal protein" supplement (50% protein) on high wheat rations supplemented with oil meals, green foodstuffs and riboflavin appeared to be no more than 1·5% of the total ration.

The results indicated that some other factor essential for maximum hatchability on such rations is supplied in adequate amounts by the addition of oil meals such as peanut, linseed and coconut meal and green foodstuffs, but not by meatmeal.—L. Hart.

Jean-Blain, M. (1946.) Carence calcique chez le lapin. **[Calcium deficiency in the rabbit.]**—*Rev. Méd. vét., Lyon et Toulouse.* **97.** 307–311. **758**

In the bucks sexual activity remained unaltered though the progeny were often weak. In the does insemination did not always lead to conception. Pregnant does, however, brought forth their young normally and without difficulty, and suckled them. Some of the does died between the 25th and the 35th day after parturition, towards the end of lactation, a few even after weaning. There was a very high mortality among young does prematurely impregnated. Death took place in convulsions, but P.M. appearances were normal. The young, which had progressed normally before weaning, subsequently became stunted. Many died but no macroscopic lesions could be found. Radiography showed that the essential lesion was an osteoporosis, but occasionally a rachitic long bone was encountered. Feeding with lucerne hay promoted normal growth and alleviated symptoms. Diagnosis was based on the syndrome, the response to calcium-rich food and the lack of response to vitamin D and phosphoric acid. In fact bran, with its high P : Ca ratio, increased the mortality rate.—L. M. Markson.

Holmes, A. D., McKey, B. V., Wertz, A. W., Lindquist, H. G., & Parkinson, L. R. (1946.) **The vitamin content of mare's milk.**—*J. Dairy Sci.* **29.** 163–171. **759**

Three Percheron mares in mid-lactation and one pony near the end of lactation were milked to provide samples for assay of vitamin content. As the three Percherons were suckling foals only enough milk for this purpose was drawn, the samples consisting of fore-milk only. Forty samples in all were taken. Results are tabulated and show an average ascorbic acid content of 12·9 mg. per l., nicotinic acid 0·72 mg. per l., pantothenic acid 2·77 mg. per l., riboflavin 0·11 mg. per l., thiamine 0·39 mg. per l., fat 1·2%, total solids 10·20% and fat globule size 3·4μ.

—G. L. Bailey.

Zietler, J. A. (1946.) **The effect of riboflavin deficiency on renal damage due to sulphanilylguanidine in the albino rat.**—*Canad. J. Res.* Sect. E. **24.** 23–30. **760**

Certain B and K vitamins can be synthesized

by different intestinal bacteria. Thus, to deprive rats of riboflavin when fed a diet deficient in this substance, sulphanilylguanidine at a level of 0·75% of the ration was fed for 78 days. The control group was maintained on the basic ration; group two on the basic ration plus 0·75% sulphanilylguanidine; group three on the riboflavin deficient ration and group four on the riboflavin deficient ration plus 0·75% sulphanilylguanidine. The drug added to the basal ration had a negligible effect on growth, but when added to the riboflavin deficient ration there was a cessation of growth accompanied by anaemia and hypoprothrombinaemia. The symptoms of vitamin K deficiency disappeared on administration of 2-methyl-1, 4-naphthoquinone. Sulphanilylguanidine produced renal damage and urinary calculi were found only in animals that received the drug. The data indicate that symptoms of riboflavin deficiency are aggravated by sulphanilylguanidine and, conversely, that toxic effects of the drug are aggravated by riboflavin deficiency.—P. J. G. P.

Hay, E. C., Prado, J. L., & Selye, H. (1948.) **The diet and hormonally induced nephrosclerosis.**—*Canad. J. Res.* Sect. E. **26.** 212–227. **761**

Kidney lesions resembling chronic nephritis and nephrosclerosis developed in rats treated with L.A.P. (lyophilized anterior pituitary) and fed "purina", but did not occur in rats similarly treated and fed "purina" mixed with maize starch in a 1 : 1 ratio. Treated rats fed 30% casein and 54% maize starch developed nephrosclerosis; similarly treated rats fed 15% casein and 69% maize starch did not develop such lesions. The different response was caused by the protein and not the maize starch. Various proteins differed in their ability to cause kidney damage; casein, egg albumin and wheat glutien were more damaging than lactalbumin, gelatin or zein.

The appearance of renal lesions was not associated with gross change in urine pH, but was preceded by albuminuria. The methods employed accelerated the development of kidney lesions, apparently identical with those that ensue on the feeding of high protein diets.—P. J. G. Plummer.

See also absts. **670** (pantothenic acid deficiency); **854** (amino acids).

Cameron, A. T., & Carmichael, J. (1946.) **The effect of acute starvation on the body organs of the adult white rat, with special reference to the adrenal glands.**—*Canad. J. Res.* Sect. E. **24.** 37–48. **762**

Rats not fed but given water exhibit, two or three days *ante-mortem*, a typical behaviour syndrome, characterized by increased activity, and subsequently, in old animals, marked immobility. At the pre-mortal stage the animals have lost 30% or more of body weight. The adrenal glands are enlarged and dark grey in colour. These glands contain more water (possibly confined to the cells of the cortex); the solid content is practically unaltered. The glomerular zone appears thinner, the reticular zone is abnormal also. The adrenal glands were normal in animals killed before they lost 30% of body weight. The enlargement occurring in the pre-mortal stage is regarded as a pathological process. Kidneys, heart and gonads of starved rats lose weight more slowly than the whole body; liver and spleen more rapidly; the thyroid at about the same rate.

—P. J. G. Plummer.

DISEASES, GENERAL

Schneider, R. (1946.) Uber den Kropf des Pferdes und dessen Beseitigung durch Operation. **[The surgery of goitre in horses.]**—*Schweiz. Arch. Tierheilk.* **88.** 39–43. **763**

A general discussion on goitre in horses with remarks on circumstances that may relate to its causation. Medical treatment may retard further development but rarely causes a return of the thyroid gland to normal; the disease is commonly at an advanced stage before there is an opportunity to commence treatment. Surgical treatment is discussed and it is stated that the surgical removal is rarely necessary.—C. Aharoni.

Koens, H. (1946.) Enkele praktijkervaringen op het gebied van aandoeningen, die zich voordoen gedurende de eerste levensdagen onder de lameren op het Eiland Texel. **[Diseases affecting newborn lambs on the island of Texel.]**—*Tijdschr. Diergeneesk.* **71.** 545–556. [English summary.] **764**

K. surveys the diseases encountered in newborn lambs, ranging from stillbirth to starvation, navel infection, foot and mouth disease, lamb dysentery, *Diplococcus* infections, swayback, certain nervous conditions, nutritional deficiencies, intestinal atony, ocular disturbances, etc.

—S. M. G.

Davidson, O. G., & La Vere Davidson, J. (1947.) **A symptomatic treatment for canine hysteria.**—*Vet. Med.* **42.** 304–305. **765**

Sodium nicotinate solution administered intravenously or intramuscularly to 42 dogs with canine hysteria gave satisfactory results. Only one dog failed to recover; this dog may have been a case of virus encephalitis. The authors consider that sodium nicotinate solution causes peripheral

vasodilatation and may draw the blood from the hyperaemic areas of the brain and spinal cord. This treatment is recommended in cases of hysteria caused by absorption of toxins from the intestinal tract.—E. M. J.

RAINEY, J. W. (1947.) **Aetiology of canine hysteria.** [**Correspondence.**]—*Vet. Rec.* **59.** 406. **766**

R. states that in nearly seven years of town and country practice in Australia not one typical case of hysteria was observed. Flour is bleached by the ozone process. He discusses the theories of Mellanby and of Hare.—E. M. J.

KIRK, H. (1947.) **Diet and canine hysteria.** [**Correspondence.**]—*Brit. med. J.* Feb. 1st. 200–201. **767**

K. discusses Mellanby's findings [see *V. B.* **17.** 33] in connexion with feeding agenized flour to dogs and raises the question whether the condition produced by Mellanby is that which the veterinary surgeon recognizes clinically as hysteria or some other condition.

If 90% of the flour consumed in Great Britain is agenized, many animals must consume it, whether in bread or biscuit form. The many thousands of racing greyhounds are normally fed (in times of abundance) upon stale bread as part of their food, and the greater part of this bread must have been made from agenized flour. The occurrence of hysteria is, however, comparatively rare.

Since a change of food is an effective remedy for the condition, K. considers that the aetiological factor may possibly be a parasite of wheat or a mould that might develop on stale bread. Russell Greig (1922) found that epileptiform convulsions could be caused by a wheat parasite, *Tilletia critici*, in the alimentary tract. K. states that in 300 greyhounds over which he had veterinary control there was no case of hysteria during a period of more than a year.—E. M. J.

KIRK, H. (1947.) **Diet and canine hysteria.** [**Correspondence.**]—*Brit. med. J.* Feb. 15th. 270. **768**

Brion [*V. B.* **18.** 12.] states that hysteria in dogs has been rife in France especially in the south, all ages and breeds of dogs being equally susceptible. Dogs which received biscuits or mongrels living only on kitchen scraps were affected alike. It was concluded that biscuits do not play any part in the cause of canine hysteria. Moreover, flour in France is not subjected to any form of bleaching or improving process. The cause of hysteria must be different from that occurring in Mellanby's dogs.

K. adds that a large number of dogs in England subsist entirely upon horse flesh, yet they are not immune from hysteria.—E. M. J.

NEWELL, G. W., ERICKSON, T. C., GILSON, W. E., & ELVEHJEM, C. A. (1947.) **Effect of wheat gluten diet on the electroencephalograms of dogs.**—*Proc. Soc. exp. Biol., N.Y.* **65.** 115–116. **769**

The authors describe a method of determining the electroencephalogram changes in mongrel puppies ranging in age from 6–8 weeks. When casein was fed in the ration satisfactory normal records were obtained. When wheat gluten was fed instead of casein, generalized convulsions were frequently observed after 3–10 days. The authors found that both the epileptiform seizures and the abnormalities observed in the electroencephalograms were comparable to those seen in human epilepsy.—E. M. J.

CLARK, M. H., JOSHUA, J. O., HODGMAN, S. F. J., PARRY, H., & UVAROV, O. (1948.) **Canine hysteria and agenised flour.** [**Correspondence.**] —*Vet. Rec.* **60.** 103. **770**

In regard to Mellanby's film entitled "Canine Hysteria", the authors state that in several cases shown in the film the clinical signs were not typical of the condition; the disorder was not similar to the form of canine hysteria observed in England during the war years. The animals appeared to exhibit neurological signs strongly indicative of localized nervous defects. Further, the severe epileptiform convulsion is not a common feature.

The authors raise the question whether the disorder was a single aetiological entity. They state that "agene intoxication" may be a more suitable diagnosis for Mellanby's experimental cases than canine hysteria".—E. M. J.

PARRY, H. B. (1948.) **Canine-hysteria in relation to diet.**—*Vet. Rec.* **60.** 389–392. **771**

P. considers that canine hysteria depends upon dietary factors:—(a) those which, like agenized wheat protein, set up within the animal's central nervous system a state of hysteria-proneness and (b) those which enhance the action. He classifies diets according to their hysteriagenic activity:—(1) hysteria-producing, (2) hysteria-inducing, (3) hysteria-precipitating and (4) hysteria-depressing diets.—E. M. J.

KONDE, W. N. (1947.) **Congenital subluxation of the coxofemoral joint in the German shepherd dog.**—*N. Amer. Vet.* **28.** 595–599. **772**

The initial lesion in cases of congenital sublaxation of the hip is described as a tendency towards a flattened acetabular cavity. This permits of excessive movement of the joint surfaces and results in flattening of the acetabulum and head of the femur, as can be demonstrated by radiographs. In severe cases actual shortening of the head and neck of the femur is said to occur.

The pathological change appears to be arrested in from 4–6 weeks and if excessive destruction has not taken place the dog can accommodate, and little abnormality either in gait or conformation is noticed after one year of age. In other cases the symptoms are described as pain on hip pressure, widening of the hips and disinclination to move on an uneven plane. These cases can only be classified as congenital if no history of injury is presented; this is usually the case and K. gives the pedigree and clinical history of one family of German sheep dogs in support of his contention that the condition is a hereditary trait and congenital.—C. W. Ottaway.

Chaikoff, I. L., Lindsay, S., Lorenz, F. W., & Entenman, C. (1948.) **Production of atheromatosis in the aorta of the bird by the administration of diethylstilbestrol.**—*J. exp. Med.* **88.** 373–387. [Authors' summary copied *verbatim.*] **773**

A new experimental procedure for the production of arteriosclerosis in the bird is described. The subcutaneous implantation of diethylstilbestrol by means of which a sustained increase in the concentration of cholesterol, phospholipid, and neutral fat can be readily established, is shown to induce atherosclerosis of the aorta.

The atherosclerosis has been compared with that artificially induced in the bird by the prolonged feeding of cholesterol and also with that occurring spontaneously. The stilbestrol-induced lesion more closely resembled the spontaneously occurring one in the bird than did that produced by cholesterol feeding. But all 3 lesions were fundamentally similar, differing only in the amounts and proportions of the various lipid constituents present.

The concentrations of cholesterol in plasma of the stilbestrol-treated and cholesterol-fed birds were of the same order. Yet cholesterol constituted a greater proportion of the lipids deposited in the arterial wall of the cholesterol-fed than in that of the stilbestrol-treated birds. This finding suggests that the cholesterol content of the vascular lesion depends not only on the absolute concentration of cholesterol in plasma, but also on the proportion of cholesterol to other lipid constituents in plasma.

Goormaghtigh, N. (1947.) **The renal arteriolar changes in the anuric crush syndrome.**—*Amer. J. Path.* **23.** 513–529. **774**

G. describes the histological findings in the kidneys of six patients showing renal deficiency, oliguria or anuria. Four of the patients died within four to nine days following crushing injuries while the other two cases were of "traumatic uraemia". No detailed clinical or P.M. reports were available but the systolic blood pressures were recorded in three of the cases examined and they showed hypertension.

G. considers that the histological findings in the kidneys examined can be correlated with the changes prevailing in cases of hypertension shortly before death. He considers that the cortical ischaemia may be caused by constriction of the post-glomerular arterioles and contraction of the glomerular capillaries due to the smooth muscle cells of the overlying mesangium. As a result of the relative reduction in the glomerular blood flow there would be a relative reduction in the filtration rate over the capsular membrane. He describes relaxation of the glomerular capillaries in some cases but considers that this is brought about by a loss of fibrillar elements in the mesangium as a result of anoxic conditions resulting from the reduced blood supply. Retrograde changes can occur in the pre-glomerular arterioles following disturbance of the circulation in the glomerular capillaries so that the fibrillar elements of the vessel wall become afibrillar and granular. G. postulates that these granular cells are the source of a hormone with vasopressor or pre-vasopressor activities which, while normally only affecting the adjacent smooth muscle cells lying within the kidney, may, as a result of marked circulatory disturbance, be produced in sufficient quantity to cause a general vasoconstriction and a rise in the systemic blood pressure. Patches of subendothelial transudate in the pre-glomerular and post-glomerular arterioles, present in all cases examined, are put forward as evidence in support of the author's opinion that the vasopressor substance is formed within the walls of the renal arterioles, as a result of the activation of transuded plasma globulin by the hormone produced by the smooth muscle cells.

The author states that similar renal lesions are seen in eclamptic anuria, fulminating glomerulonephritis, fatal crush wounds and traumatic uraemia.—F. R. Bell.

Weis, J. (1946.) Diafanoskopise u domácích zvířat. **[Use of the diaphanoscope in domestic animals.]**—*Čas. československ. Vet.* **1.** 194–197. **775**

W. describes the use of the diaphanoscope in the examination of the accessory nasal sinuses in domestic animals, using a modified Wolsen-Heryng's instrument. Accompaning graphs give the diaphanograms of horses, cattle and dogs. He considers the method to be of value, especially in small animal practice.—E. Přibyl.

Weis, J. (1946.) Nemoci vedlejších nosních dutin u domácích zvířat a diafanoskopie. **[Diseases of accessory nasal sinuses in domestic**

animals and diaphanoscopy.]—*Čas. československ. Vet.* **1.** 40–43. **776**

This is a general survey of the subject of anatomy, physiology and pathology of the accessory nasal sinuses in domestic animals. The method of diaphanoscopy may be of great service in veterinary medicine and sometimes it is superior to that of X-ray examination.—E. PŘIBYL.

See also abst. **853** (renal diseases),

POISONS AND POISONING

KRÜGER, E. (1944.) Die Verhütung der schädlichen Wirkung fluorhaltiger Industrieexhalationen. **[Prevention of injurious effect of fluorine-containing industrial fumes.]**—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **52/50.** 271–278. **777**

It is stated that some success has been achieved in cleansing fluorine-containing gases as they leave the factory chimneys, so that adjacent land is not contaminated, and that it was found experimentally that the fluorine can be removed in part from lucerne by treatment with hydrochloric or formic acid and so render affected silage harmless. It is suggested alternatively that such substances as aluminium sulphate and lime in the diet would lessen the toxic effects of fluorine. [The practicability of this treatment for silage might be questioned and its efficacy is doubtful.] —R. MARSHALL.

FRANK, J. F. (1948.) **The toxicity of sodium chlorate herbicides.**—*Canad. J. comp. Med.* **12.** 216–218. **778**

Because of reported poisoning of animals after access to roadside vegetation that had been sprayed with sodium chlorate herbicides, F. tested the effect of measured doses of spray ingredients on rats, and of sprayed grass on sheep.

Sodium chlorate was found to be less toxic in rats (L.D.50 = 7–8 mg. per kg.) than ammonium sulphate (3–4 mg. per kg.), calcium chloride (1–2 mg. per kg.) and soda ash (approx. 4 mg. per kg.), which are common ingredients of the sprays.

In sheep grazing on plots heavily sprayed with the herbicides there were no toxic effects over a seven-day period.

It is concluded that such sprays have a low toxicity for laboratory rats and sheep.—W. E. S.

ZORKO, E. (1947.) Ein Beitrag zur Wirkung von Tetrachlormethan und Tetrachloraethylen. (Vergleichendes toxikologisch-, pathologisch-anatomisches und histologisches Bild der Veränderungen von Leber, Herz und Nieren durch CCl_4 und C_2Cl_4 beim Kaninchen.) **[The pathology of poisoning by tetrachlormethane and tetrachlorethylene.]**—*Inaug. Diss., Zagreb.* [Abst. in *Wien. tierärztl. Mschr.* **34.** 295–296. (1947.)] **779**

In rabbits the average toxic dose of carbon tetrachloride is 2 ml. per kg. and the lethal dose 5 ml. per kg. Toxic symptoms include dyspnoea, clonic spasm, severe thirst and anorexia, and the P.M. findings, catarrhal enteritis, parenchymatous degeneration of the liver, myocardial degeneration and fatty infiltration of the kidneys.

In rabbits the average toxic dose of tetrachlorethylene is 2 ml. per kg. and the lethal dose 4 ml. per kg. Symptoms are preponderantly narcotic and there is severe irritation of the eyes and nose. P.M. findings closely resemble those produced by carbon tetrachloride.—J. E.

MCLEAN, J. W. (1948.) **Lameness in sheep following dipping in rotenone bearing powders and benzene hexachloride (gammexane).**—*Aust. vet. J.* **24.** 144–147. **780**

The author describes a peculiar lameness following the dipping of sheep in washes containing, as the sole insecticidal ingredients, either rotenone-bearing powders or benzene hexachloride.

Lameness first appears two and a half to four days after dipping. The incidence increases for about a week when in the worst outbreaks 70–80% of the flock may be infected. Inflammatory changes may affect one leg only, or all four legs from the coronet to about half way up the metacarpus or metatarsus, and although lameness is extreme the appearance of the affected legs does not indicate a severe inflammation. Most sheep recover in 10–14 days, but some cases persist. Deaths are rare, but affected sheep lose condition.

Occurrences of lameness were sporadic. Usually sheep dipped on the first day in freshly prepared wash were not affected, but lameness may appear in those dipped on subsequent days. If a dipping bath, use of which has resulted in lameness, is cleaned out and replenished with fresh wash, no lameness occurs until the wash has been used for at least a day.

It appeared that the wash became "dangerous" only after a day or two of use during which it became fouled with faecal material and dirt.

The condition may be caused by an infection following contamination of the dipping wash, or by percutaneous absorption of toxic materials from the wash.

The lameness described was seen only when dipping washes which did not contain some bactericidal or bacteriostatic agent, were used.

The author stated that lesions on the hands of men who had handled dipping washes which produced lameness in sheep resembled erysipeloid.
—H. McL. Gordon.

Blood, D. C., Craven, C. P., & Astill, K. J. (1948.) **The toxicity of gammexane for cats. [Correspondence.]**—*Aust. vet. J.* **24.** 131. **781**

In correspondence Blood *et al.* describe a fatal case in which a long-haired Persian cat in poor bodily condition died after a bath in a 1 : 1,000 suspension of a dispersible gammexane powder (containing 50% of benzene hexachloride and 6·5% of the γ isomer) after a preliminary bath in warm soapy water. Symptoms began four hours later with shivering and passed on to clonic convulsions. Intravenous injection of calcium gluconate was without effect.

Experimentally no ill-effect occurred in a short-haired cat bathed in an identical suspension without a preliminary soapy water bath, but when repeated a week later, after a preliminary bath in warm soapy water, symptoms of toxicity appeared five and a half hours later. The animal recovered within 24 hours.—H. McL. Gordon.

Frank, J. F. (1947.) **The toxic effects of coccidiostatic sulphonamides in chickens. II. Miscellaneous observations on nutritional factors, intestinal flora and egg production.**—*Canad. J. comp. Med.* **11.** 315–323. [For previous part, see *V. B.* **18.** 455.] **782**

There was an apparent reduction in the number of coliform organisms in the caecal contents of birds fed 1% sodium sulphamethazine in the mash for 14 days. There was no evidence of interference with the synthesis of vitamin K in the intestine from feeding 1% of the drug to chicks on a K-deficient diet for two periods of seven days. Hepatic and splenic lesions described by some authors appear to be associated with some factor other than sulphonamide therapy. The administration of 8·14 g. of sodium sulphamethazine daily to laying hens for one week did not affect shell thickness but caused a reduction in egg production, which returned to normal after four weeks.—R. Gwatkin.

Clarke, E. G. C. (1947.) **Poisoning by castor seed.**—*Vet. J.* **103.** 273–278. **783**

C. gives a general account of the known information about the toxic properties of castor seeds. The active substance, ricin, is highly toxic ; a lethal dose of less than 0·0001 mg. per kg. body weight has been recorded. The substance is antigenic ; immunity can be conferred and immune serum prepared. It agglutinates red blood cells and suspensions of other body cells.

Susceptibility to poisoning by castor seeds in domestic animals appears to be greatest in the horse, less in sheep, cattle and pigs and least in ducks and poultry. The symptoms and lesions are described.

C. emphasizes the value for laboratory diagnosis of protection tests in mice using specific anti-ricin serum.—R. Marshall.

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

Kohn, F., & Cross, C. D. (1948.) **Treatment of local infection with diamidines.**—*Lancet.* **255.** 647–651. [Authors' summary copied *verbatim.*] **784**

The effects of dibrompropamidine and iodohexamidine on infected wounds have been examined. Dibrompropamidine powdered into surface wounds inhibits infections with gram-negative bacilli, *Ps. pyocyanea*, and *Bact. coli*, and it may find a place in the treatment of appendix abscess and resultant peritonitis. Dibrompropamidine in castor-oil cream provides a convenient non-toxic practical alternative to sulphonamides and penicillin for the treatment of surface infections with gram-positive cocci. In a carbowax propylene-glycol base its action on gram-negative organisms is also manifest. From the limited experiments made with iodohexamidine it seems to provide a useful alternative to dibrompropamidine when bacterial strains initially resistant to the latter are encountered.

Pratt, R., & Dufrenoy, J. (1947.) **Cytochemical mechanisms of penicillin action. IV. Comparative responses of Gram-positive and Gram-negative bacteria to penicillin.**—*J. Bact.* **54.** 719–730. [Authors' summary copied *verbatim.*] **785**

A study has been made of physical and chemical changes that occur in different parts of penicillin assay plates seeded with gram-positive and with gram-negative test organisms. The techniques that were used were intended to reveal differential changes that occur in cells under the influence of bactericidal, lytic, inhibiting, and stimulating concentrations of penicillin as contrasted with the reaction of cells in the normal background where the concentration of penicillin remains ineffective. It was found that the same pattern developed in all penicillin plates treated with a given reagent, irrespective of the test organism, provided the proper concentrations of penicillin were used and provided the proper

balance of the biological and physical factors involved in the cylinder plate method of assay was achieved. The latter was found to be largely a matter of properly controlling the relative lengths of the primary incubation period, when the organisms were in the lag period, and of the secondary incubation period, during which the organisms were in the log phase of growth and during which penicillin was diffusing through the medium in the plates.

The evidence indicates that penicillin affects aerobic gram-positive and gram-negative organisms through the same chemical systems. The threshold concentration at which its effects become manifest is, however, many times greater on plates seeded with gram-negative organisms than on those seeded with gram-positive organisms. The proper use of trace amounts of cobalt lowers the effective threshold on test plates, a fact which may have practical clinical importance as well as theoretical interest, since the same phenomenon has been demonstrated *in vivo*.

ROWLANDS, S., ROWLEY, D., & STEWART, H. C. (1948.) **Absorption and excretion studies with radioactive penicillin.**—*Lancet.* **255.** 493–495. [Authors' summary copied *verbatim.*] **786**

Urinary excretion studies were carried out in female cats using penicillin labelled with S^{35}. Intramuscular injections of ordinary and labelled penicillin gave rise to a urinary excretion of 100% of the radioactive sulphur isotope, but to a much smaller recovery of penicillin. There was no evidence of retention of penicillin in the body as the radioactive breakdown products were excreted over the same time interval as the penicillin. When the labelled penicillin was given by mouth much less was excreted; the amount of radioactivity remaining in the gut at the end of the experiment suggested that non-absorption would account for the penicillin not found in the urine.

GEORGE, M., & PANDALAI, K. M. (1948.) **Significance of the Gram test for bacteria in relation to penicillin bacteriostasis.**—*Brit. med. J.* May 29th. 1028–1029. **787**

It was found that magnesium ribonucleate had a similar effect on both Gram-negative and Gram-positive bacteria under penicillin influence. It antagonized the inhibitory action of penicillin in both groups of organisms. On the other hand magnesium ions in the form of $MgSO_4$ added to penicillin increased the inhibitory action of this drug. It diminished, for example, the minimum inhibitory dose of penicillin for *Bact. coli in vitro* to about 50% of its original value.—E. K.-N.

JAMES, U., KRAMER, I. R. H., & ARMITAGE, P. (1948.) **Infantile gastro-enteritis treated with streptomycin by mouth.**—*Lancet.* **255.** 555–561. [Authors' summary copied *verbatim.*] **788**

Streptomycin was given by mouth in thirty cases of infantile gastro-enteritis. Its effects were most striking in the critically ill cases, in cases of recurrent diarrhoea and vomiting, and in neonatal gastro-enteritis. Vomiting ceased early, weight was rapidly gained, the appetite returned, the stools improved, and there was almost immediate improvement in the general condition.

Streptomycin 2 g. by mouth in 7 days was given without producing toxic effects. It was palatable and well tolerated, even where there had been copious vomiting.

The administration of streptomycin by mouth does not obviate the necessity of treating parenteral infection, which may play a part in the causation of gastro-enteritis.

There is a danger that pathogens remote from the gut may be rendered streptomycin-resistant by the small amount of streptomycin that enters the blood-stream.

Streptomycin by mouth effectively eliminated *Proteus vulgaris* from the stools and was also effective in cases of gastro-enteritis where no pathogenic organisms were found.

Streptomycin by mouth shortened the course of gastro-enteritis to a considerable extent, the usual time of discharge from hospital being 9–14 days after the start of treatment, even in the very severe cases. This is a great asset in alleviating the pressure on beds and lessening the risk of cross-infection.

The early administration of streptomycin by mouth in gastro-enteritis may make it possible to omit a period of starvation and to give generous feeds throughout the illness.

It is not expected that all types of gastro-enteritis of unknown aetiology or those of virus origin will respond to streptomycin given by mouth.

FELDMAN, W. H., & HINSHAW, H. C. (1948.) **Streptomycin; a valuable anti-tuberculosis agent.**—*Brit. med. J.* Jan. 17th. 89–92. **789**

This review deals in a first paragraph with the effect of streptomycin on the course of experimental TB. in g. pigs and mice. Its beneficial effect in these animals is exerted by suppressing the normal growth-progression of the bacilli rather than by bactericidal action. Its favourable effect in animals justified the extension of these investigations to tuberculous patients. In a second part of the review the results are placed on record of streptomycin treatment in the various tuberculous conditions occurring in man, such as miliary and meningeal TB., pulmonary TB., tuberculous laryngitis and endobronchitis, tuberculous sinuses, lymph nodes, bones and joints, tuberculous enteritis and peritonitis, as well as the

results of streptomycin application in surgical procedures. The dosage, the best methods of application and the frequency of injections are further discussed. The therapeutic limitations of streptomycin are dealt with, among which the toxicity and the development of resistant strains are probably the most serious. The positive results with streptomycin treatment are considered to be sufficiently great to justify its general use in certain types of TB. E. K.-N.

WAKSMAN, S. A., REILLY, H. C., & SCHATZ, A. (1945.) **Strain specificity and production of antibiotic substances. V. Strain resistance of bacteria to antibiotic substances, especially to streptomycin.**—*Proc. nat. Acad. Sci.* **31.** 157–164. [Abst. in *Bull. Hyg. Lond.* **21.** 136. (1946), copied *verbatim.* Signed: L. P. GARROD.] **790**

The susceptibility to streptomycin of different strains of *Bact. coli*, *Proteus vulgaris*, *Staph. aureus* and *B. subtilis* was determined, and found to vary considerably. The relationship between this and susceptibility to streptothricin and clavacin was also studied: with the former some degree of correspondence was observed, but with the latter none.

RHYMER, I., & WALLACE, G. I. (1947.) **Studies on the mode of action of streptomycin. II. The nature of a streptomycin inhibitor occurring in brain tissue and plant extracts.**—*J. Bact.* **54.** 521–526. [Discussions and conclusions copied *verbatim.*] **791**

Antibacterial activity of streptomycin has been shown to be greatly influenced by the composition of the medium in which it is acting. A brain heart infusion shows great ability to inhibit the action of streptomycin. Certain peptones, especially phytone, a peptone made from plant proteins, also have this ability but to a lesser degree. Studies have indicated that the activity is due to something which can be extracted from the media, thus indicating that a specific substance or group of substances is responsible for the inhibitory action. Tests have shown that brain tissue contains large amounts of an active substance. Greater activity was observed with the extract of brain than with the phytone. Further studies are being made to determine its nature.

FLORESTANO, H. J., & BAHLER, M. E. (1948.) **Investigation of some newer sulfonamides as intestinal chemotherapeutic agents.**—*J. Pharmacol.* **92.** 196–206. **792**

A preliminary study of three new sulphonamides as chemotherapeutic agents:—2 sulphanilamido-5-carbamylthiazole, 2-(N^4-succinamylsulphanilamido)-thiazole, and 2-(N^4-succinylsulphanilamido)-1,3,4-thiadiazole.

In experiments on mice and dogs, succinylsulphathiadiazole had an anti-*coli* activity much greater than that of sulphathalidine in mice and about equal to that of sulphathalidine in dogs. Succinylsulphathiadiazole was absorbed into the blood only to a small extent.—M. R. OMERÖD.

FREAR, D. E. H., & SEIFERLE, E. J. (1947.) **Chemical structure and insecticidal efficiency.**—*J. econ. Ent.* **40.** 736–741. [Authors' summary copied *verbatim.*] **793**

A total of 6155 chemical compounds on which insecticidal tests have been made has been collected from published and unpublished results. The constituent chemical groupings present in these compounds have been studied in relation to the results of the toxicity tests. It has been found that certain of these groups are regularly associated with high toxicity, while others are associated with low toxicity. The findings are presented as a guide for workers who are interested in the synthesis of compounds of insecticidal value.

JOHNS, C. K. (1948.) **Influence of organic matter on the germicidal efficiency of quaternary ammonium and hypochlorite compounds.**—*Canad. J. Res.* Sect. F. **26.** 91–104. **794**

The influence of skim milk, in various concentrations, on the germicidal potency of roccal (an alkyl dimethylbenzylammonium chloride) and of hypochlorite solutions containing 10–12% of available chlorine was studied. The germicides retained activity in the presence of even a high concentration of skim milk, especially against *Staph. aureus.* Low concentrations frequently increased the germicidal activity in laboratory and factory tests.

There was a more rapid decline in the effectiveness of hypochlorite beyond a certain concentration than with roccal. Roccal prepared with tap water was less active against *Bact. coli* than when prepared with distilled water. Differences did not occur with the hypochlorite. Similar findings were observed but to a lesser extent with *Staph. aureus.* Skim milk lowered the germicidal action of tap water solutions of roccal to a greater extent than for distilled water solution; the reverse was true for the hypochlorite.—P. J. G. PLUMMER.

See also abstr. **613** (mastitis); **636** (tuberculosis); **651** and **652** (brucellosis); **672** (D.D.T. for trypanosomiasis); **673** (antryeide); **674** (phenanthridinium); **681** (malaria); **682** (blackhead); **722** (rickettsia infection); **730** and **732** (parasiticides); **733** (anthelmintics); **736** (phenothiazine); **779** (carbon tetrachloride); **780** (gammexane); **835–837** (sex hormones).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

BARTLETT, S., FOLLEY, S. J., ROWLAND, S. J., CURNOW, D. H., & SIMPSON, S. A. (1948.) **Oestrogens in grass and their possible effects on milk secretion. [Correspondence.]**—*Nature, Lond.* **162.** 845. **795**

When cows go out to grass in the spring, a

rise in milk yield and a marked increase in the solids-not-fat content of the milk occurs. This effect is not attributable to the ingestion of extra nutrients as it does not occur when liberal supplements of carbohydrate, protein or carotene are made to the ordinary winter rations of cows. The authors, impressed by the findings of BENNETTS *et al.* [*V. B.* **15.** 330] that subterranean clover in Australia contained an oestrogen and knowing that administration of an oestrogen to cows will increase the solid content of cows' milk, examined samples of spring grass for the presence of an oestrogen. Samples of actively growing herbage from a number of pastures were extracted and the extracts tested for oestrogenic activity by their effect on the weight of the uteri of immature mice, six mice being used in each group.

The results are tabulated. Oestrogen was demonstrated in grass and in clover while hay extracts were negative.

These preliminary results support the theory that the galactopoietic effects of spring grass may be due to the presence of oestrogen.—M. C.

ROBINSON, M. (1947.) **Hormones and lactation. Dried thyroid gland.**—*Lancet.* **253.** 385–387. **796**

194 women who failed to lactate satisfactorily in the puerperium were treated with dried thyroid gland (B.P. 1932) in daily doses ranging from 0·13–0·80 g. There was an improvement in lactation following the treatment, the best results being obtained with doses of 0·6 g. and over. Similar beneficial results were obtained in 60 cases treated with injections of 1·6–3·2 mg. thyroxin daily.—A. T. COWIE.

ALLEN, C. E., DOW, D. S., LOGAN, V. S., & MACKENZIE, C. D. (1948.) **Some effects of feeding synthetic thyroprotein to dairy cows.**—*Sci. Agric.* **28.** 340–356. **797**

Protomone, a synthetic thyroprotein was fed to Holstein and Ayrshire cows at the rate of 16 g. daily for six weeks. It contained 3·07% thyroxin. There was increased milk production at first but it declined rapidly subsequent to treatment. There was an increase in the butter-fat but not in the solids-not-fat percentages. Bodyweight losses were observed in all treated cows in spite of additional meal. Pulse rates were elevated but respiratory rates and temperatures were not affected. No specific symptoms of iodism were observed. It is concluded that until further knowledge of the action of thyroprotein is obtained its use cannot be recommended.—R. GWATKIN.

HIBBS, J. W., & KRAUSS, W. E. (1947.) **The effect of thyroprotein ("Protamone") on milk production and on some of the constituents of the milk and blood of dairy cows.**—*J. Anim. Sci.* **6.** 161–178. **798**

A series of experiments on small numbers of cows is described, and the responses of the animals to iodinated casein feeding, at the rate of 1 g. per 53 lb. bodyweight are presented in tables. An increase in milk production is reported, but no change in butter-fat or total protein percentage of the milk. The cows receiving treatment lost weight and the pulse and respiration rates increased.

Analyses of the milk and blood plasma revealed no changes in the carotene and ascorbic acid content, but there was a fall in the vitamin A content of the milk of some treated cows. The results are not claimed to be conclusive owing to the small numbers of animals and inconsistent responses.

The thiamine content of the milk of the treated animals fell in relation to that of the milk of the control animals, but not to levels below the normal range of values. The riboflavin content remained unaltered. It is suggested that vitamin A and thiamine deficiencies may result from prolonged feeding of iodinated casein.—G. L. B.

WHITBY, L. E. H. (1949.) **The physiology of haemopoiesis.**—*J. R. Inst. publ. Hlth.* **12.** 19–34. [Author's summary slightly modified.] **799**

In this brief review I have tried to cover some of the physiological aspects of haemopoiesis, particularly in relation to nutrition of the haemopoietic system and its integration with other systems in the body. Most time has been devoted to erythropoiesis because this has been more exactly studied on account of the many stages of development of the red cell which can be observed in marrow specimens and because red cells are easily obtained in quantity. The red cell has a unique composition as well as a most highly specialized structure allowing an active function to be performed after the nucleus has been extruded, with an efficiency so great that the cell consumes almost none of the oxygen which it transports. This function is performed for as long as 120 days despite the wear and tear of the circulation. Most of the corpuscle is made up of haemoglobin. The rest consists of stroma containing protein and lipids. Haemoglobin, one of the most easily purified proteins, is a unique combination of protoporphyrin, iron and globin. Despite knowledge as to the structure of haemoglobin but little is known of the mechanism of synthesis and nothing of how it comes to be incorporated in the stroma of the cell. The factors which influence and control the absorption of iron have been reasonably explored but the manner in which iron is stored in the tissues and more particularly the conditions required for release and utilization are little understood. The globin of haemoglobin is presumably derived from the

metabolic pool of protein which yields protein for this purpose in preference to all other needs. Protoporphyrin is synthesized from simple building stones such as glycine and acetic acid but the intermediate phases have not been unravelled. Many other substances are essential for ensuring the union of iron, protoporphyrin and globin and for regulating the orderly production of some three hundred thousand million red cells per day. Copper appears to play some part but the manner in which it does so and the stage in erythropoiesis for which it is required are quite unknown. Cobalt likewise would seem to be an essential trace element, more especially since it has been identified in what is believed to be the haemopoietic principle. This principle, essential for the proper maturation of erythrocytes and without which blood formation becomes disordered at an early level, is ordinarily available in ample quantity with a reasonable diet and an efficient gastric mucosa. Likewise with the many variants of pteroylglutamic acid which can readily be derived from the conjugates that are so widely distributed. The study of these factors has thrown much light on enzyme action and has opened a wide field for investigation in relation to antagonists which may possibly influence the malignant proliferation of such diseases as leukaemia. Vitamins of the B, C and D groups play their part in assisting absorption of metals, ensuring maturation and exerting a general nutritional influence on the marrow. Likewise with hormones and internal secretions of which some appear to be general metabolic stimulants, whilst others exert an indirect influence mainly on gastric function, and others such as the splenic factor, a regulating power which is almost specific. An overriding requirement is a properly functioning alimentary canal which will ensure adequate digestion and absorption of the essential requirements which are then presented to a healthy liver for storage or distribution.

In medical practice the integration of these many systems affords the clinician an unlimited series of jig-saw puzzles and the elucidation of the mechanism at fault in anaemias may be difficult.

LAWRENCE, J. S., & VALENTINE, W. N. (1947.) **The blood platelets. The rate of their utilization in the cat.**—*Blood.* **2.** 40–49. **800**

The rate of disappearance of blood platelets was studied in cats previously rendered artificially thromboplastic by prolonged radiation and subsequently infused with normal platelets by temporary cross circulation technique with a normal cat. By the examination of repeated counts the rate at which the platelets disappeared and returned to their pre-cross circulation count was observed.

A certain lack of uniformity of results from experiment to experiment was noted and attributed to the varying demands for platelets made by different animals, but slightly more than two to four days were necessary for cross circulated platelets to disappear from the blood stream of the recipient and the entire mass of platelets in cats require replacement every three to five days. Platelet transfusion is unsuccessful unless by cross circulation technique, which indicates a loss of blood platelets when blood comes into contact with non-living surfaces.—BERNARD WEITZ.

JENNINGS, A. R. (1947.) **Haematology of healthy kittens.**—*Vet. J.* **103.** 234–239. **801**

Details are given of the results of examining blood from the cephalic vein of 25 kittens, 1–6 months old, the majority being females. The haematology of cats has received little attention. The results of the various counts are tabulated.
—J. A. J. VENN.

REBUCK, J. W. (1947.) **The structure of the giant cells in the blood-forming organs.**—*J. Lab. clin. Med.* **32.** 660–699. [Author's comment copied *verbatim.*] **802**

The structure of the giant cells of the blood-forming organs in both physiologic and pathologic processes has been presented in atlas form. Attention of the hematologist is directed to variations of the giant mesenchymal structures of the hematopoietic organs in conditions not ordinarily of prime hematologic interest, for the reason that such affections are of the same stromal site or origin as are many of the blood dyscrasias. The use of dry-fixed smears or impression preparations of the blood-forming organs in conjunction with tissue sections afford another source of information regarding structural characteristics of many giant cell types.

It is hoped that the collection of photomicrographic representations of the many giant cell types within the scope of a single article will provide an opportunity for ready comparison of both related and unrelated giant cell forms and will serve as an aid in the determination of the nature and degree of such relationships or differences.

BARRIÈRE, G. (1945.) Les glandes parathyroïdes du boeuf. **[The parathyroid gland of the ox.]** —*Bull. Acad. vét. Fr.* **18.** 348–354. **803**

In the adult ox two parathyroid glands are found on each side of the neck. The external parathyroid is situated in the region of the bifurcation of the carotid artery at the level of the pharynx in close proximity to the digastricus muscle. It is near the site of origin of the thymus and may be associated with a regressing lobule of that gland. The gland varies in size from 6–13 mm. and the average weight is given as 250–

300 mg. The internal parathyroid is in contact with the upper surface of the thyroid gland, rarely within the capsule of the thyroid, resting between the oesophagus and trachea. Its dimensions are given as 9–13 mm. long, 2–9 mm. in depth and 2–4 mm. across, with an average weight of 30–50 mg.—C. W. Ottaway.

Schreiber, J. (1947.) Beiträge zur vergleichenden Anatomie und zur Mechanik des Kniegelenkes. **[Comparative anatomy and mechanism of the knee joint.]**—*Wien. tierärztl. Mschr.* **34.** 725–744. **804**

In the light of clinical findings in injury of the stifle joint and the known cursorial habits of the animal, S. reviews the anatomy of the stifle region of the dog, in search of anatomical weak spots which might predispose to injury and as a structural organization permitting of normal movement.

Particular attention is paid to the blood supply which is described in detail. The intravascular injection of contrast material allowed an estimation to be obtained of displacement of the vessels during movement of the joint when viewed on radiographs. An account is also given of the play of the menisci on the articular surfaces of the joint during movement and therefore their accommodation to various weight bearing postures. —C. W. Ottaway.

Romanes, G. J. (1947.) **The prenatal medullation of the sheep's nervous system.**—*J. Anat.* **81.** 64–81. [Summary copied *verbatim.*] **805**

The order of medullation is described in many of the tracts in the nervous system of the foetal sheep. Medullation starts at the 63rd day of gestation with the vestibular apparatus, the lower motor neurones and the reticulo-spinal tracts. By 78 days the midbrain connexions have begun to acquire medullary sheaths, and the first myelin appears in the forebrain at 96 days.

A comparison of the time of medullation with the functional development described by Barcroft & Barron shows that function in most regions of the brain is established 3–4 weeks before medullation begins. In contrast the optic nerve begins to be medullated 50 days before full term. The relation between the onset of medullation and function is not clear, but it is certain that normal function can occur in the absence of myelin and, in the optic tract at least, medullation begins in the absence of normal function.

The possibility is discussed that medullation is an inherent developmental characteristic which is independent of function but may be accelerated by it.

Edwards, D. A. W. (1946.) **The blood supply and lymphatic drainage of tendons.**—*J. Anat.* **80.** 147–152. **806**

Paucity of accounts of the vascular pattern of tendons prompted this experiment in which flexor and extensor tendons in the metacarpal and metatarsal regions of the cow, calf, adult human subject, g. pig and dog were used. The vessels were injected chiefly with indian ink; attempts to inject both blood and lymph vessels in the same specimen were not satisfactory.

The basic pattern was found to be the same whatever the source of supply or situation of the tendon. The vessels are situated in the interfascicular spaces and inter-fascicular grooves on the surface of the tendon. Anastomoses frequently help to form a uniform plexus and one artery was found to be accompanied by two veins and usually four lymphatics. The lymphatic capillaries can be distinguished from the blood vessels on account of their larger bore, irregular lumen, and increase in number which, with their anastomoses, produce a mesh with irregular spaces. In the synovial membrane the pattern is more of a series of anastomatic arcades of decreasing size. The presence of lymphatic valves in the synovial layers is not clear, but evidence suggests that valves occur in loose folds of the membrane, particularly in vessels proximal to the lymphatic network itself and in the meso tendon.

The findings are discussed in the light of the surgical pathology of tendons.—C. W. Ottaway.

Björk, V. O. (1948.) **An artificial heart or cardiopulmonary machine. Performance in animals.**—*Lancet.* **255.** 491–493. [Author's summary copied *verbatim.*] **807**

Animal experiments have proved that the perfusion apparatus described can perform the functions of heart and lungs for a sufficient time to permit bloodless intracardiac operations. Dogs have shown no ill effects after half an hour's perfusion of the brain.

See also absts. **841** (pulse rate and temperature); **853** (parathyroid glands and the skeleton).

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

Hopkins, J. W., & Trevoy, R. M. (1948.) **Liquid and frozen egg. IV. Reproducibility of measurements of reducing sugar in frozen egg.** —*Canad. J. Res.* Sect. F. **26.** 221–227. **808**

Analysis of 16 test samples in three collaborating laboratories indicated the desirability of initial standardization and periodic checking of reagents and of both sampling and analytical technique, to ensure consistency of routine results. Average glucose content of a consignment of 1,250 38-lb.

containers might be determined with a standard error of the order of ±10 mg. per 100 g. egg by a single analysis of each of two independent composite samples, each obtained by combining and thoroughly mixing single "cores" taken from 15 containers chosen at random. This would also enable a running check to be kept on both the average and variance of the reported glucose contents by, *e.g.* "control chart" methods. Precision of test results would be improved most effectively by increasing the number of individual containers sampled rather than the number of chemical analyses.—P. J. G. PLUMMER.

GIBBONS, N. E., FULTON, C. O., & REID, M. (1946.) **Dried whole egg powder. XXI. Pasteurization of liquid egg and its effect on quality of the powder.**—*Canad. J. Res.* Sect. F. **24.** 327–337. **809**

When liquid egg was heated to 60°C. in a pasteurizer and held at that temperature for 30 min. the viable bacterial count was reduced by 98–99%. Organisms such as coliforms, salmonella and coagulase positive staphylococci usually present in dried egg powders were destroyed by this process. Tests with a laboratory flash pasteurizer indicated that a considerable reduction in the number of viable organisms occurred when liquid egg was heated from 22° to 60°C., the total time in the pasteurizer being approximately one min.

Quality tests, including fluorescence value, potassium chloride value, moisture content and palatability, did not indicate any significant difference between powders prepared from heated and unheated melange, either originally or after storage.—J. W. PULLEN.

RICHTER, C. P. (1945.) **The development and use of alpha-naphthyl thiourea (antu) as a rat poison.**—*J. Amer. med. Ass.* **129.** 927–931. **810**

Alpha-naphthyl thiourea (antu) compares very favourably with other rodenticides at present available in regard to cost, toxicity and voluntary acceptance by rats. It is a relatively specific poison for Norway rats (*Rattus norvegicus*), being less toxic to all other species tested (see below). Its emetic property protects dogs in most cases. No toxic symptoms in human beings were observed during three years of extensive use in a city. Toxicity tests with wild Norway rats, the poison being administered by stomach tube, gave an L.D.50 of 7 mg. per kg. compared with 40 for zinc phosphide and 150–300 for red squill. In tests on other animals, only the Norway rat, the mouse and the dog were killed by doses less than 100 mg. per kg. of body weight; the Alexandrine rat, the squirrel and g. pig required a dose between 100 and 400 mg. per kg., while monkeys, rabbits and chickens were even more resistant: 5 g. per kg. were required to kill 100% of groups of chickens and monkeys.

Antu kills rats and dogs by its action on the capillaries of the lung, producing drowning oedema. No antidote is yet available but its insolubility makes prompt stomach lavage a useful counter measure.—H. PAVER.

ANON. (1947.) Midlertidig lov om sivil tjenesteplikt for laeger m.v. [**(Norway) : Provisional law regarding compulsory civilian duty for doctors, veterinarians etc.**]—*Norsk VetTidsskr.* **59.** 185–188. **811**

Owing to shortage of qualified personnel in Norway, a new law was enforced from April 1947 for one year for compulsory direction of members of the medical and related professions where necessary, to civilian stations or duties.—F. E. W.

—. (1945.) Decreto No. 24. 955/45. [**Argentina : decree concerning foundation of foot and mouth disease vaccine institute.**]—*Gac. vet., B. Aires.* **7.** 323–329. **812**

This is the text of a decree dated 10.10.45 authorizing the establishment of an institute for the study of foot and mouth disease and for the production and distribution of products for the prevention of the disease.

Funds are allocated for buildings, equipment, library, salaries of staff, etc.—M. C.

HANSELL, P., & OLLERENSHAW, R. G. W. (1947.) **Applied photography. Relation of the photographic department to the teaching hospital.**—*Lancet.* **253.** 663–666. **813**

Photography is playing an increasingly important role in the medical sciences. The establishment of a medical photographic department in hospitals has teaching potentialities but so far few teaching hospitals are making the best use of their photographic units. Such a department has two primary functions :– the production of routine record photographs of the highest quality and the adaptation and application of these records to medical education in its widest sense.

NÁDVORNÍK, F. (1946.) K. zřízení Všeslovanské organisace veterinářů. [**Foundation of the Pan-Slav Veterinary Union.**]—*Čas. československ. Vet.* **1.** 345. **814**

The Pan-Slav Veterinary Union was founded on the occasion of the eleventh International Veterinary Congress, London, 1930. Its activities continued until 1938 when they were interrupted by the second world war. The Union edited *Revue Vetérinaire Slave*, which published abstracts from veterinary literature in Slavonic languages.

A brief history of the activities of the Pan-Slav Veterinary Union is given and suggestions are made for its revival.—E. PŘIBYL.

LIVESTOCK HYGIENE

(a) Jordan, R. C., Jacobs, S. E., & Davies, H. E. F. (1947.) **Studies in the dynamics of disinfection. VIII. The effect of lethal temperatures on standard cultures of *Bact. coli*. I. A detailed analysis of the variations of death-rate with time.**—*J. Hyg., Camb.* **45.** 136–143. [Summary copied *verbatim*. For part VII, see *V. B.* **17.** 344.] **815**

(*b*) Jordan, R. C., Jacobs, S. E., & Davies, H. E. F. (1947.) **Studies in the dynamics of disinfection. IX. The effect of lethal temperatures on standard cultures of *Bact. coli*. I. The nature of the probit-log survival-time relationship at pH 7·0.**—*Ibid.* **45.** 144–148. [Summary copied *verbatim*.] **816**

[*Note*.—These papers are marked VIII . . . I and IX . . . I respectively. The reason for giving the sub-group No. I in each case is not apparent as there do not, in either case, appear to be other sub-groups.]

(a) Whole cultures of *Bact. coli* grown under carefully controlled conditions have been subjected to the action of heat at temperatures ranging from 47 to 55°C. and the survivor curves determined.

The occurrence of excessive variation between replicate plates of counts made when the mortality exceeds 95% was very much less evident than when phenol was the lethal agent.

At temperatures of 35°C. and below, disinfection of the cultures was never complete, as a permanent population of cells became established. In some cases the numbers of heat-resistant cells reached nearly 0·01% of the original population, but great fluctuations were observed.

The death-rate during the active part of the disinfection was not constant but, in general, increased with time. In the faster disinfections this increase was difficult to detect and the logarithmic death-rate appeared to be virtually constant, but the increase is nevertheless believed to have been present in all cases.

The data for all the experiments have been combined to give a composite disinfection curve from which it was concluded that the death-rate was low at first but rose to a maximum at which it remained constant until the mortality had reached at least 99·99%.

This finding led to the decision to treat all the experiment as if the regression of log survivors on time had been linear between mortalities of 90 and 99·99%. The standard errors of the calculated regression coefficients were small, so that this method of treating the experimental data appears to be justified.

(b) A study has been made of the probit-log survival-time relationship in a number of experiments in which whole standard cultures of *Bact. coli* were subjected to heat at temperatures ranging from 47 to 55°C.

It is concluded that the whole mortality up to 99·99% could not be covered by a single straight-line relationship since the graphs are curves concave upwards and to the left.

Between 95 and 99·99% mortality the relationship approximated closely to linearity.

Several individual experiments showed "humps" in their curves. These, although always occurring at the same stage in time in the disinfections, varied in their probit levels.

By combining the data for all experiments, an idealized probit-log survival-time curve was obtained in which the changes of slope were less marked than in the curve representing the disinfection of similar cultures by phenol.

Veselý, J. (1946.) Adravotně-veterinární služba u Jednotného svazu českých zemědělců. **[The veterinary sanitation service in the Union of Czech farmers.]**—*Čas. československ. Vet.* **1.** 6–9. **817**

A discussion on the place of domestic animals in a planned agricultural programme, together with an account of the action of the Union of Czech farmers which set up a veterinary sanitation service as one of its departments. The duties of the department are set out.—E. Přibyl.

Vlasák, J. (1946.) Veterinářská činnost v zoologické zahradě. **[Veterinary activities in the Zoological Garden in Prague.]**—*Čas. československ. Vet.* **1.** 9–14. **818**

During the recent war 5,291 animals of about 300 species were maintained in the zoological garden in Prague. The author describes the work of maintaining the health of these animals and the manner in which the food supply was arranged, involving short rations and food substitutes.

—E. Přibyl.

REPRODUCTION AND REPRODUCTIVE DISORDERS

Reeds, C. R. (1948.) **Problems in the operation of an artificial insemination unit.**—*Canad. J. comp. Med.* **12.** 12–15. **819**

R. lists the problems encountered in the operation of an artificial insemination unit as being "problems developing from the over use of bulls, return calls, pregnancy diagnosis, the shipping and carrying of semen, and the keeping of records". He states that bulls should be at least two or perhaps three years old before being placed in

service and should not be used more frequently than four or five times a month.

The paper contains the case history of each of four sires and a brief description of the records kept.—THOMAS MOORE.

VAN DRIMMELEN, G. C. (1947.) **Artificial breeding of poultry.**—*J. S. Afr. vet. med. Ass.* **18.** 39–44. **820**

This is a review article summarizing recent work on the breeding of poultry by artificial insemination. The methods of semen collection from the male bird and the subsequent insemination of female birds is very clearly described and illustrated. The uses of artificial insemination in poultry are discussed briefly.—F. R. BELL.

KREĬNINA, K., & KEDROV, V. (1940.) **[Determination of ovulation in mares by examination of vaginal smears.]**—*Iskusst. Osemen. sel'khoz. Zhivotn.* **1.** 270–277. **821**

Vaginal smears from 41 mares were examined daily from widely separated areas representative of the vagina as a whole, and the results compared with those of rectal examination for ovulation and of testing with a teaser stallion.

During the oestrous cycle the changes in the epithelial cells of vaginal smears occurred periodically. In the pre-ovulation period the flat keratin-containing cells were replaced by coarse polygonal cells which stained lilac or crimson. In the second period these stained sky-blue and keratin-containing cells reappeared. During the resting phase the smear contained mainly flat epithelial cells containing degenerating keratin and protoplasm, which in most cases remained unstained; the stained mucus was a lilac-blue. The change from the resting phase usually occurred 10–36 hours before ovulation commenced.—K. A. A.

KENT, G. C., Jr., & MIXNER, J. P. (1945.) **Use of vaginal smears in mating the golden hamster.**—*Proc. Soc. exp. Biol., N.Y.* **59.** 251–253. **822**

In order to minimize injuries due to unsocial behaviour between hamsters of opposite sexes determination of the proper time for mating by means of vaginal smears was employed. The samples were obtained by means of a sterile platinum loop, moistened with physiological saline, and introduced high up into the vagina. The smears were examined unstained and the male placed in the cage only when the female was in pro-oestrus or oestrus and was left there for 48 hours. Ninety-eight matings by this method produced 49 pregnancies, which is considered to be a satisfactory conception rate for the golden hamster under laboratory conditions.—F. R. BELL.

GALLINA, L. (1947.) Il problema della sterilità del bestiame. **[Sterility in cattle.]**—*Clin. vet., Milano.* **70.** 186–192. **823**

G. believes that the most important aspect of this problem is diagnosis. In his experience, sterility is due in great part to ovarian dysfunction or to deficient feeding. Other important causes are TB., peritonitis, *Brucella* infection and trichomoniasis.—I. W. JENNINGS.

TAUSSIG, S. (1946.) **The problem of fertility in dairy cattle and its improvement through breeding.**—*Mon. Bull. agric. Sci. (Italy).* **37.** 256T–261T. **824**

The fertility of a herd composed of 11 families of cows was measured by the average number of days between calvings for each cow. These figures indicated the inheritability of fertility. The implications of this are discussed, and the similarity between improving a herd for butter-fat production by selection of suitable animals and improvement for fertility is stressed.—G. L. B.

MOORE, G. R. (1948.) **The causes and diagnosis of infertility in bulls.**—*J. Amer. vet. med. Ass.* **112.** 25–29. **825**

M. discusses generally the importance of the bull in the herd; he also considers some of the causes of infertility in bulls and emphasizes the importance of adequate examination of semen samples when assessing the value of any bull.

—F. R. BELL.

NATALINI, O. (1947.) Alta percentuale di sterilità nei bovini della Sardegna. **[High percentage of bovine sterility in Sardinia.]**—*Zooprofilassi.* **2.** No. 8. pp. 14–16. **826**

The problem in Sardinia is not so much complete sterility as a temporary infertility, due to ovarian dysfunction following malnutrition and infestation by metazoan parasites. Treatment involves improved feeding, aided by chemical ovarian stimulants.—I. W. JENNINGS.

BLOM, E. (1944.) **On the occurrence in bull sperm of certain "medusa formations" derived from the epithelium of the efferent ducts of the testis.**—*Acta path. microbiol. scand.* **21.** 713–720. [In English.] **827**

The formations described are estimated to occur at the rate of one to 10^4 spermatozoa in the ejaculates of normal bulls. In smears stained with alkaline methyl violet the "medusa formations" consist of a deeply stained granular base 2–5μ in diameter from which arise 8–30 filaments 10–15μ in length. They are detached fragments of the ciliated coat of the efferent ducts. Semen of stallions contains more than that of bulls. They have no diagnostic significance, but should not be confused with polycaudate spermatozoa in which the tails are always 60–70μ long.—T. H. F.

GREEN, W. W., & WINTERS, L. M. (1945.) **Urinary 17-ketosteroid excretion by boars.**—*J. agric. Res.* **71.** 507–516. **828**

17-ketosteroid excretion by boars of different lines of inbred swine was assayed from 48-hour urine samples and the results subjected to a detailed statistical analysis. It was found that the quantity of ketosteroids excreted rose steadily from some time before puberty until some time afterwards, followed by a decline in the excretion. Two types of seasonal variation were noted—(1) the season of the year in which the animal was born had a noticeable effect, the spring-born group excreted more ketosteroids after 20 weeks of age than the autumn-born group; (2) season effects, as such, independent of the season of birth, also influenced excretion since in both spring- and autumn-born boars there was a fall in the ketosteroid excretion in February and March. Although there was an apparent positive correlation between the ketosteroid excretion and the volume of urine, this proved to be circumstantial, the quantity of urine having no real effect on the ketosteroid excretion. There appeared to be a close correlation between the sex behaviour of boars by lines and the quantity of hormone excreted. Castration reduced the ketosteroid excretion but did not abolish it entirely.—A. T. C.

DE WIT, J. J. D. (1947.) Nieuwere inzichten inzake de stofwisseling van zoogdieren-sperma. **[The metabolism of mammalian sperm.]**—*Tijdschr. Diergeneesk.* **72.** 54–57. [English summary.] **829**

A note on a visit to Great Britain and of work seen.—F. E. W.

MANN, T. (1946.) **Studies on the metabolism of semen. 3. Fructose as a normal constituent of seminal plasma. Site of formation and function of fructose in semen.**—*Biochem. J.* **40.** 481–491. [For previous parts, see *V. B.* **16.** 277.] **830**

The reducing carbohydrate of seminal plasma was proved to be *d*(–) fructose and not glucose as was formerly thought. Fructose was purified from seminal plasma and identified by its reducing value, optical activity, yeast fermentability and by the characteristic methyl-phenyl fructosazone. The fructose present accounts for practically all the yeast-fermentable reducing sugar in the seminal plasma of the bull, ram, rabbit, boar and man. There is little, if any, trace of glucose. The level of fructose varies according to the species and also within the species, the highest value found being 1 g. per 100 ml. in the bull. There is practically no fructose in semen taken direct from the epididymis, the sugar being added from the accessory reproductive glands, principally the seminal vesicles, or, where these do not exist, *e.g.*, in the rabbit, from the prostate gland.

The function of fructose in semen appears to be to supply the spermatozoa with readily glycolysable substances; on storage the fructose content progressively falls whilst that of lactic acid rises. Although spermatozoa normally utilize fructose, the principal sugar available in seminal plasma, they are equally capable of using glucose and mannose. The glycolysis of these sugars in sperm is initiated by a hexokinase reaction with ATP [adenosinetriphosphate] to form monophosphohexose which then passes through the stages of diphosphohexose, phosphotriose, phosphoglyceric acid and pyruvic acid to lactic acid.—A. E.

CHAMPY, C., & DEMAY, M. (1947.) Tumeur ovarienne féminisante chez une faisane castrée par la folliculine. **[An ovarian tumor in a pheasant castrated by injection of folliculine.]**—*C.R. Soc. Biol. Paris.* **141.** 634–635. **831**

A large injection of oestrogen will suppress ovarian function in birds for considerable periods and in the case of the pheasant for very long periods. A pheasant, hormonally "ovariectomized" in the first year of age by a single injection of 2 mg. oestrogen remained sterile for nine years and developed male plumage. In the ninth year, however, after a moult, the plumage was of an intermediate type similar to that observed in ovariectomized pheasants in which traces of ovary remain. The pheasant was accidentally killed in the tenth year and an ovarian tumour about the size of a small plum was found P.M. The tumour was composed of ovarian stroma tissue and numerous strands of clear cells believed to be immature gonocyte cells. It is considered that these cells may have been secreting oestrogen and may have been responsible for the change in plumage. Possible causes of the tumour are discussed.—A. T. COWIE.

AUSTIN, C. R., WHITTEN, W. K., FRANKLIN, M. C., & REID, R. L. (1947.) **The effect of hexoestrol on the food intake of sheep.**—*Aust. J. exp. Biol. med. Sci.* **25.** 343–346. **832**

In ewes treated with hexoestrol there was marked depression of appetite. The effect was brief, and continued inappetence was produced only when hexoestrol was administered every two or three days.—M. C. FRANKLIN.

COURRIER, R., & MAROIS, M. (1947.) La relaxine existe-t-elle ? **[Does relaxin exist ?]**—*C.R. Soc. Biol. Paris.* **141.** 1202–1203. **833**

When 10 μg. oestradiol and 2·3 mg. progesterone were injected daily into adult ovariectomized g. pigs, dislocation of the pubic symphysis occurred by the 9th day and by the 12th day a gap of 10–15 mm. was present. Hysterectomy prior to treatment with oestrogen and progesterone prevented separation of the pubes. If, however, a small portion of the uterus was left,

separation occurred. The endometrium appeared to be the all-important uterine factor and it is considered possible that it may secrete relaxin when under the influence of oestrogen and progesterone. These results support the contention that while progesterone and oestrogen in combination will cause dislocation of the pubic symphysis, this action is indirect whereas relaxin acts directly.
—A. T. COWIE.

HEENEY, A. D. P. (1948.) **Oestrogenic preparations for poultry. Food and Drugs Act—amendment to the regulations under the Act re the use of oestrogenic preparations for poultry.**—*Canad. J. comp. Med.* **12.** pp. 11. **834**

The Minister of National Health and Welfare reported that the administration of oestrogenic preparations to poultry for the purpose of fattening and tenderizing the flesh may produce results injurious to persons consuming poultry so treated. Therefore this regulation has been passed under the authority of the Food and Drugs Act and provides that :- (a) No person shall sell, offer for sale or expose for sale, for consumption as food, poultry to which has been administered any preparation having oestrogenic activity. (b) No person shall sell, offer for sale or expose for sale, for administration to poultry which may be consumed as food, any substance having oestrogenic activity.—THOMAS MOORE.

NILSSON, S. A. (1944.) Terapi med sexualhormon vid hudsjukdomar och laktomani hos hund. **[Sex hormone therapy of skin diseases and pseudopregnancy in bitches.**—*Skand. Vet-Tidskr.* **34.** 705–733. [English summary.] **835**

N. administered "follidrin", a follicular hormone preparation, to 61 bitches affected simultaneously with skin disease—pruritus, prurigo, eczema and alopecia—and with disturbances of the oestrous cycle.

Thirty-nine cases cleared up completely, in 17 there was improvement, while in five there was no change. The dosage varied from 4,000–25,000 I.U. of follidrin, injected 2–6 times every third day.

Sixteen bitches were treated for pseudopregnancy, in 14 with completely satisfactory results. N. considers this treatment especially suitable in cases where there is a plentiful milk secretion.

Treatment of dermatosis in male dogs with testosterone was less successful, and N. recommends its use only in the most stubborn cases.
—F. E. W.

QUIN, J. I. (1946.) **The use of gonadotrophic substances in the treatment of reproductive disorders in animals.**—*J. S. Afr. vet. med. Ass.* **17.** 52–58. **836**

This is a brief discourse on sex-hormone therapy. No references are given.—A. T. COWIE.

GRUNNET, J. (1942.) **Studies on hereditary dwarfism in mice. V. Investigations of the tissue in the islets of Langerhans in normal mice and in dwarfs.**—*Acta path. microbiol. scand.* **19.** 563–574. [In English.] **837**

A strain of mice affected with dwarfism due to a defect in the anterior pituitary gland, transmissible as a recessive character, was used in the investigations. G. found that the bodyweight curve is of an exponential character and that the relationship between weight of pancreas and bodyweight is linear. This relationship is true for normal mice as well as for anterior pituitary dwarf mice.

Estimations of the volume and weight of the Islet of Langerhans tissue were made using the following method. The pancreas was removed *in toto* from the freshly killed animal and fixed in Helly's fluid. The whole pancreas was cut serially at 7μ and stained with haematoxylin and eosin. Each islet was followed through the sections and since the majority are ellipsoidal in shape the volume could be calculated following measurement with a micrometer. The volume could then be converted into weight, G. assuming that the specific gravity of the insular tissue is 1·000. In the dwarf mice insular tissue constituted 1·9–8·2 parts per thousand (average value 3·8 parts per thousand) of the pancreas and in normal mice from 0·6–2·8 parts per thousand (average value 1·75 parts per thousand).

Since the anterior pituitary dwarfs have a greater amount of insular tissue than normal mice in relation to pancreas weight and total body weight, and since surface area cannot be the controlling factor, then the difference may be due to the absence or deficiency of some anterior pituitary hormone. G. postulates that the anterior pituitary lobe in the normal animal produces a hormone which inhibits the development of islet tissue and that its partial or complete suppression in mice with hereditary pituitary dwarfism accounts for the increased amount of islet tissue.—F. R. BELL.

COMMON, R. H., RUTLEDGE, W. A., & HALE, R. W. (1947.) **Gonadal hormones and mineral balance in the domestic fowl.**—*Nature, Lond.* **160.** 541–542. **838**

It is known that a pullet begins to retain large amounts of Ca and P 10–14 days before laying commences. The authors attempted to imitate this effect by administering gonadal hormones to immature pullets (aged 10–14 weeks). 24 mg. oestradiol diproprionate or 8 mg. testosterone proprionate each given over 12 days produced no effect, but a highly significant increase in retention

of Ca and P occurred when both hormones were given together [doses not stated]. In addition, coincident testosterone potentiated the oestrogen effect upon the oviduct, but it did not potentiate the rise in serum Ca and plasma P induced by oestrogen. The authors consider that prior to laying, the endogenous androgen becomes of physiological significance. They quote in support the changes in character of the pullet's head at this time to a more masculine type. They noted also that serum riboflavin and the inorganic, lipoid, and phosphoprotein P of plasma rise after oestrogen treatment, but serum citric acid concentration falls.—R. J. Fitzpatrick.

Murphree, R. L., Warwick, E. J., Casida, L. E., & McShan, W. H. (1947.) **Influence of reproductive stage upon the fertility of gonadotrophin-treated female rabbits.**—*Endocrinology.* **41.** 308–311. **839**

Eighty-eight female rabbits were grouped as follows :– (a) 16 juvenile ; (b) 43 oestrous ; (c) 18 anoestrous ; (d) 11 pseudopregnant. Ovulation was induced by priming for five days with a purified follicle stimulating hormone extract followed on the sixth day with an ovulating dose of an unfractionated anterior pituitary extract. Artificial insemination, with semen known to be fertile, was effected on the sixth and seventh days and the animals were killed 45–78 hours after the last injection of hormone. Ova were collected from Fallopian tubes by washing and were examined microscopically. Only those ova showing normal equal cleavage were considered as fertile. Although all groups yielded the same number of ova per rabbit (about 30) those of group (d) were all non-fertile. The authors suggest that the 100% infertility of group (d) is due to the presence of the corpus luteum.

—R. J. Fitzpatrick.

Jones, G. E. S., Delfa, E., & Foote, E. C. (1946.) **The effect of thiouracil hypothyroidism on reproduction in the rat.**—*Endocrinology.* **38.** 337–344. **840**

Rats were maintained on drinking water containing 0·1% thiouracil for periods of 45–259 days ; and at intervals they were mated with normal rats to determine their fertility. Estimated daily intake of thiouracil was 24 mg. by males and 20 mg. by females. This produced typical hyperplasia of the thyroid gland. Excluding three rats with neoplasms, of 11 males ten sired litters although two required two matings.

Fifteen females were mated 27 times with 100% conception rate as judged by vaginal smears ; of these, five pregnancies terminated normally and the remaining 22 resorbed. In only two of these were foetuses palpable, and to ensure that dioestrous smears were not due to pseudopregnancy, laparotomy was performed in six cases. Pregnancy was confirmed in all six. The five full-term pregnancies all resulted from matings on the 84th day of treatment. Four resorptions occurred after the same period and the remainder after 126–212 days of thiouracil administration.

The authors conclude that gametogenesis is not affected by the drug, but they suggest that the thyroid may be necessary for full utilization of oestrogen or progesterone. In the females tested thiouracil may thus have rendered endogenous oestrogen or progesterone inadequate to maintain pregnancy.—R. J. Fitzpatrick.

See also absts. **646-648** (brucellosis in boars) ; **795** (oestrogens in grass) ; **842** (buffaloes).

ZOOTECHNY

Seath, D. M., & Miller, G. D. (1946.) **The relative importance of high temperature and high humidity as factors influencing respiration rate, body temperature, and pulse rate of dairy cows.**—*J. Dairy Sci.* **29.** 465–472. **841**

In 1944, 36 Holstein and 16 Jersey cows were observed on consecutive days twice weekly during seven weeks ; in 1945, 41 Holstein and 27 Jersey cows were observed during a period of approximately three weeks. Wet and dry bulb temperatures were recorded at the time of the observations. Air temperature and body temperature, and air temperature and respiration rate were closely correlated. Humidity and body temperature were slightly correlated and humidity and respiration rate were very slightly negatively correlated. Pulse rates were not greatly influenced by air temperature ; pulse rates and humidity gave inconsistant correlations, and so no conclusions could be drawn. Diagrams and a table illustrate the results.—G. L. Bailey.

Rigor, T. V. (1947.) **Observations on the breeding season of native carabaos at Alabang.**—*Philipp. J. anim. Indust.* **9.** 15–18. **842**

Breeding of buffaloes may be continuous throughout the year and usually is on farms when the diet is constant. In the countryside, seasonal variations in the birth rate occur owing to the seasonal alteration of nutrition rate.

—R. Macgregor.

Darlow, A. E. (1947.) **Animal husbandry in Great Britain.**—*J. Anim. Sci.* **6.** 211–216. **843**

One of a series of articles written by outside

observers for a world-wide view of animal husbandry for the American Society of Animal Production.

The changes in Britain are described, whereby as a result of the war home production of animal products was increased in order to cut down imports. Comment is made on the small amount of control of brucellosis and tuberculosis in cattle and also on the extent to which cross-breeding occurs.—A. WILSON.

See also absts. **747** (pastures); **819** and **820** (artificial insemination).

TECHNIQUE AND APPARATUS

MAXTED, W. R. (1948.) **Preparation of streptococcal extracts for Lancefield grouping.**—*Lancet.* **255.** 255–256. **844**

A proteolytic substance produced by a *Streptomyces* is used to liberate the polysaccharide of β-haemolytic streptococci. The organisms are suspended in the enzyme solution, kept at 50°C. for about one and a half hours and, when clear, are ready for the usual precipitin test. The method is a considerable simplification of the original one. Tested on 177 strains it was more clear-cut and reliable than the Lancefield or Fuller methods.—A. MAYR-HARTING.

CASTANEDA, M. R. (1947.) **A practical method for routine blood cultures in brucellosis.**—*Proc. Soc. exp. Biol., N.Y.* **64.** 114–115. **845**

C. claims that a combined solid and liquid medium for blood cultivation in brucellosis, consisting of a 3·0% bactotryptose agar to which is added a bactotryptose broth containing sodium citrate, minimizes the risks of accidental laboratory infection, saves both time and materials and assists in rapid identification of the *Brucella* organisms. —MARCUS S. BROOKE.

OSGOOD, E. E. (1947.) **Assay of penicillin, streptomycin, trivalent organic arsenicals, and other bactericidal and bacteriostatic agents. A technique based on the original application of mathematical principles with adaptations for all assay purposes.**—*J. Lab. clin. Med.* **32.** 444–460. [Author's summary copied *verbatim.*] **846**

A quantitative method of penicillin assay is described which is flexible enough to compare favorably with any published method in simplicity, sensitivity, accuracy, range, specificity, and speed with which results are available.

It is based on turbidimetric determination, using a new principle of computation.

It is adapted to all types of penicillin assay now made and to quantitative assay of other potent bacteriostatic or bactericidal agents. Techniques for streptomycin and trivalent arsenicals are given.

The method has the advantage of employing materials and supplies already available in most laboratories and techniques with which the average laboratory technician is familiar. Results of plus or minus 25 per cent accuracy may be available within 2 hours and of plus or minus 10 per cent accuracy within 2·5 to 3 hours. For most applications there is no interference by penicillin-resistant contaminants. It will detect as little as 0·001 unit per cubic centimeter of penicillin with plus or minus 100 per cent accuracy. When performed for maximum accuracy, error can be reduced below plus or minus 5 per cent. It will cover a fourfold range with plus or minus 10 per cent accuracy, a sixfold range with plus or minus 25 per cent accuracy, and a hundredfold range with plus or minus 100 per cent accuracy at the extremes.

FISCHER, E., & MUÑOZ, R. (1947.) **Comparative bacteriostatic assays with rosaniline and its phenolic analog (rosolic acid).**—*J. Bact.* **53.** 381–388. **847**

In tests of the bacteriostatic action of the basic dye rosaniline and the phenolic (acidic) dye rosolic acid against baker's yeast, *Staphylococcus aureus*, *Shigella*, *Bact. coli* and *Salmonella typhosa*, the action of the rosaniline was stronger in a more alkaline medium, while the action of rosolic acid seemed to be independent of the pH value; both substances were much less active than the methylated basic dye malachite green. The mechanism of the bacteriostatic action of the dyes is discussed. —E. KLIENEBERGER-NOBEL.

HOOD, A. M. (1948.) **Selective media for *Pseudomonas pyocyanea*.**—*Mon. Bull. Min. Hlth publ. Hlth Lab. Serv.* **7.** 248–251. [Author's summary copied *verbatim.*] **848**

Harper and Cawston's C.T.A.B. [cetyltrimethyl-ammonium-bromide] agar, though valuable as a differential medium for the detection of *Ps. pyocyanea*, was found to be slightly inhibitory to this organism. The addition of defibrinated horse blood to give a final concentration of 10 per cent. counteracted this effect without altering the selective properties of the medium. In routine use, the value of the modified C.T.A.B. agar was substantiated.

CARSTEN, M. E. (1947.) **A rapid procedure for the embedding of eyes.**—*Arch. Path.* **44.** 96–100. [Author's summary copied *verbatim.*] **849**

Eyes can be embedded rapidly, with minimal shrinkage and distortion, by means of water-soluble "carbowax" (polyethylene glycol) and "carbowax" ester, used in succession. The entire process of embedding, sectioning and staining can be accomplished in four days.

MISCELLANEOUS

MAINLAND, D. (1948.) **Statistical methods in medical research. I. Qualitative statistics (enumeration data).**—*Canad. J. Res.* Sect. E. **26.** 1–166. **850**

M. discusses the methods used in applying the appropriate statistical treatment to qualitatively classified clinical or laboratory data, such as tests of significance in binomial and multinomial distributions, estimation of confidence limits, analysis of contingency tables, and the estimation of sample sizes required for further investigation. The first section deals with definitions and principles while the next is devoted to examples. The third section deals with notes and explanation of the examples. There are 55 pages of tables and six graphs. The 40 examples are classified so that the investigator can choose data and problems comparable to his own. M. hopes that investigators unacquainted with the principles of statistical reasoning will find a sufficient statement of principles to enable them to start using the tables and tests.—R. GWATKIN.

REPORTS

GREAT BRITAIN. (1947.) **Annual report upon the health of Blackburn for the year 1947.** [THIERENS, V. T.] pp. 156. Blackburn: T. Briggs, Ltd. Items of veterinary interest pp. 43 & 44. **851**

Of 12,215 cattle slaughtered 1,852 or 14·6% were found to be infected with TUBERCULOSIS in some degree, of these 179 were so badly affected as to require total condemnation of the carcass. Of the carcasses totally condemned cows accounted for 164, heifers for 15, bulls and bullocks nil and calves six. Of 451 pigs slaughtered 24 or 5·3% were affected in some degree with TUBERCULOSIS of which three were totally condemned.

There was a high incidence of LIVER FLUKE INFESTATION and 10,303 livers or parts of livers were condemned.—M. C.

ANON. (1948.) **Report of the FAO Mission for Poland.** pp. vi+159. Washington: Food & Agriculture Organization of the United Nations. [Items of veterinary interest pp. 92–108.] **852**

The mission, which consisted of ten specialists in various branches of agriculture, visited Poland in 1947 and this report records its findings and recommendations for development of agriculture in that country. The greater part deals with matters of plant husbandry. In the section on animal husbandry it is stated that Poland lost a very great proportion of her livestock during the war, pigs were reduced to 17%, cattle to 33%, sheep to 37% and horses to 45% of the pre-war figures. The incidence of infective diseases is high: BOVINE TUBERCULOSIS affects from 30–80% of the cattle in dairy herds, STERILITY and ABORTION are very common, SWINE ERYSIPELAS causes heavy losses, DOURINE and GLANDERS are both present, but being brought under control.

There are some 1,400 veterinary surgeons as compared with 2,073 before the war. It is considered that 3,000 are required for optimum development of the livestock industry. There are veterinary colleges at Warsaw, Wroclaw and Lublin; these colleges are seriously short of professors, books and facilities for teaching and research. It is a recommendation of the mission that everything possible be done to strengthen the teaching staff and to improve buildings, equipment and laboratory apparatus. Immediate steps to control BOVINE TUBERCULOSIS are considered to be imperative. Until some tuberculosis-free herds are established the importation of healthy cattle should be restricted. Experiments with BCG vaccination of calves are advised; mass immunization is not advised in the present state of knowledge. Communal pastures are a feature of the country and complicate measures for control of disease. To control BRUCELLOSIS blood testing, segregation of reactors and vaccination of calves with Strain 19 vaccine is recommended.

The report is well illustrated and provides a useful overall picture of the state of agriculture in post-war Poland.—M. C.

BOOK REVIEWS

GILMOUR, J. R. [M.R.C.P., Pathologist in Emergency Medical Service, Junior Assistant Director, Bernhard Baron Institute of Pathology, London Hospital]. (1947.) **The parathyroid glands and skeleton in renal disease.** pp. xiii +154. London: Oxford University Press. 18s. **853**

This book is based on a study of the parathyroid glands from 90 cases of renal disease in man and also of 527 parathyroid glands from unselected cases.

It was found that changes in the parathyroid glands are produced only by certain types of kidney disease, for example they were never found in association with ischaemic atrophy of the kidney. Five types of abnormal parathyroids are differentiated and described in detail and are then correlated with different types of kidney disease.

To the veterinarian probably the most interesting sections are those dealing with the changes in phosphorus and calcium metabolism and with the finding of marked lesions of osteitis fibrosa in the bones of many of the cases. The bone lesions are described in detail and illustrated by photographs. Osteitis fibrosa in horses as a result of feeding on a diet low in calcium and high in phosphorus is a condition well known in veterinary pathology, but the condition in man described in this book has a different aetiology. The diet in these cases was presumably normal in respect of its calcium and phosphorus content but presumably an imbalance has been brought about not by faulty diet, as in the horses, but as a result of changes in the parathyroids produced by kidney disease. The statement is made that generalized osteitis fibrosa is known already to be due to hyperparathyroidism only. If this be true of horses then one must conclude that feeding a diet low in calcium and high in phosphorus must produce hyperparathyroidism. It would be of interest to know whether the parathyroid glands of horses affected with osteitis fibrosa show changes analogous to those described in man.—M. C.

WILLIAMS, R. T. [Edited by] (1948.) **Biochemical Society symposia No. 1. The relation of optical form to biological activity in the amino-acid series.** pp. 91. Cambridge & London: Cambridge University Press. 5s. **854**

CHIBNALL gave an outline of the nomenclature of the amino-acids, and the new rules of nomenclature as agreed by the Editorial Board of the Biochemical Society and the Chemical Society, which are substantially the same as those of the American Society of Biological Chemists, have been adopted throughout.

KREBS reviewed the D- and L-amino-acid oxidases and mentioned the specificity of the enzyme for D- or L-amino-acid, the existence of D-amino-acids in nature (especially in micro-organisms) and the splitting by specific peptidases of peptides containing D-amino-acids in animal tissues. The properties of the amino-acid oxidases were dealt with under their D- and L-forms, details being given of isolation, chemical nature, mechanism of action, specificity, differential rates of oxidation, occurrence and number and their physiological significance.

LEHMANN introduced the relation between amino-acids and calcium metabolism.

NEUBERGER reviewed the mammalian metabolism of D-amino-acids with particular reference to their excretion in the urine, availability for growth (by inversion to the more susceptible L-form), the excretion of D-cysteine derivatives (indicating that D-amino-acids can take part in synthetic reactions) and the metabolism of aromatic D-amino-acids.

TRISTRAM discussed the origin of D-amino-acids in proteins and D-glutamic acid in particular and dealt with methods for detecting and estimating the isomeric forms, a theory that D-amino-acids existed in malignant tissue (subsequently shown to be incorrect), the various D-amino-acids already reported and speculations on the origin of the stereo-isomers. RYDON, discussing D-amino-acids in microbiological chemistry, pointed out that no D-amino-acid has yet been observed among the *intracellular* components of micro-organisms. D-alanine, D-valine, D-leucine, D-phenyl-alanine and D-glutamic acid have, however, all been observed in extracellular metabolic products.

There is a useful table detailing the utilization of amino-acids by micro-organisms, followed by discussion on the significance of D-amino-acids in the techniques of microbiological assay and in research on bacterial nutrition.

WORK reviewed D- and L-amino-acids in antibiotics. In particular, gramicidin-D, tyrocidine, gramicidin-S and the penicillins were discussed in detail and he concluded with the comment: "peptides can no longer be regarded simply as aggregates of physiologically inert amino-acids, but must be deemed to be a group of compounds offering unlimited possibilities of structural variation and considerable potentialities as pharmacologically specific enzyme inhibitors and chemotherapeutic agents".

BERGEL gave an account of the pharmacological properties of D- and L-amino-acids (*e.g.*, the D-series has a much sweeter taste) and of their derivatives which include carnosine, ergometrine, ephedrine and adrenalin.

HILLS dealt with the relation of optical forms to the influence of amino-acids on the germination of aerobic spores and reported previously unpublished work bearing on the mode of action of those antibiotics having a D-amino-acid as part of their chemical structure. TRACEY spoke of a possible role of D-amino-acids—by conferring a greater resistance to enzymic hydrolysis.

This symposium record will be both interesting and useful to those workers in the veterinary field dealing with problems of animal nutrition, tissue metabolism and of bacterial nutrition and chemotherapy in relation to veterinary pathogens and is an excellent beginning to the Biochemical Society's new series.—MALCOLM WOODBINE.

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